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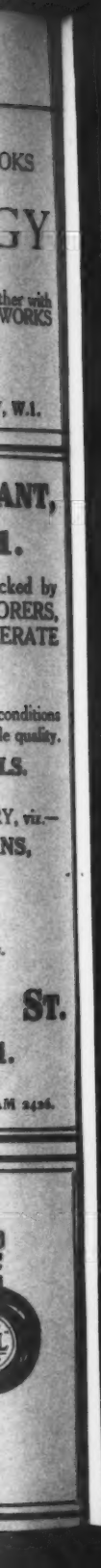


The Geographical Journal

Vol. LXIV No. 4 October 1924

THROUGH KUFRA TO DARFUR

A. M. Hassanein Bey

Read at the Meeting of the Society, 19 May 1924.

MY journey through the Libyan Desert from Sollum on the Mediterranean to El Obeid, the capital of Kordufan, in the Sudan, was made in the first half of 1923.

The inspiration for it dated from 1916, when I went with Colonel the Hon. M. G. Talbot, a distinguished officer of the Egyptian Army, who had retired and come back into service at the call to arms, on a mission to Sayed Idris El Senussi, at Zuetina, a tiny port near Jedabya in Cyrenaica. One of the purposes of the mission was to effect an agreement with Sayed Idris, as head of the Senussi and the most influential chief in Cyrenaica, which should prevent in the future Badawi raids across the western frontier of Egypt.

At Zuetina I renewed acquaintance with Sayed Idris whom I had already met, through his friendship for my father, when he was returning from his pilgrimage to Mecca in 1915.

I told Sayed Idris of my ambition and desire to make the journey to Kufra, which had been visited only once by a stranger from across the desert's border, the intrepid German explorer Rohlfs in 1879.

Sayed Idris was sympathetic with my desires, and asked me to let him know when I was ready to make the expedition. He promised to give me all the help he could in my undertaking. Early in 1917, in continuation of the same mission to the Senussi, I met their head again at Akrama, near Tobruk, and told him that I was still determined to make the journey. I proposed to go as soon as the end of the war should set me free.

Sayed Idris again encouraged my determination and renewed his promise of co-operation. There was with me then on the same mission Mr. Francis Rodd, an old Balliol friend. We discussed the proposed expedition together, and agreed that we would be companions in it.

At the close of the war Mrs. McGrath (then Mrs. Rosita Forbes) brought me a letter of introduction from Mr. Rodd. She wanted to join us on the journey. We proceeded to plan an undertaking in which we

three should participate, but when the time came, Mr. Rodd was prevented from making one of the party.

In November 1920 Mrs. Forbes and I set out from Jedabya with a caravan provided by Sayed Idris. We reached Kufra by way of Zieghen on 14 January 1921, and returned to Jaghbub direct by the Zakar Well route, and thence to Siwa and Alexandria.

This visit to Kufra only whetted my appetite for more. I realized then that beyond Kufra there lay a vast tract of unexplored desert where no stranger from the outside world had yet penetrated. There came to my ears vague rumours of "lost oases" that even the people of Kufra knew only by hearsay and tradition. The thought of those "lost" oases lent an additional attractiveness to the idea of making the journey, though it was not until I reached Kufra the second time that I finally decided to visit them.

I came back to Cairo resolved to go again, and instead of coming back from Kufra, as Mrs Forbes and I had done, to press onward to the south until I reached known territory in the Sudan, whence I would return home by way of Khartoum.

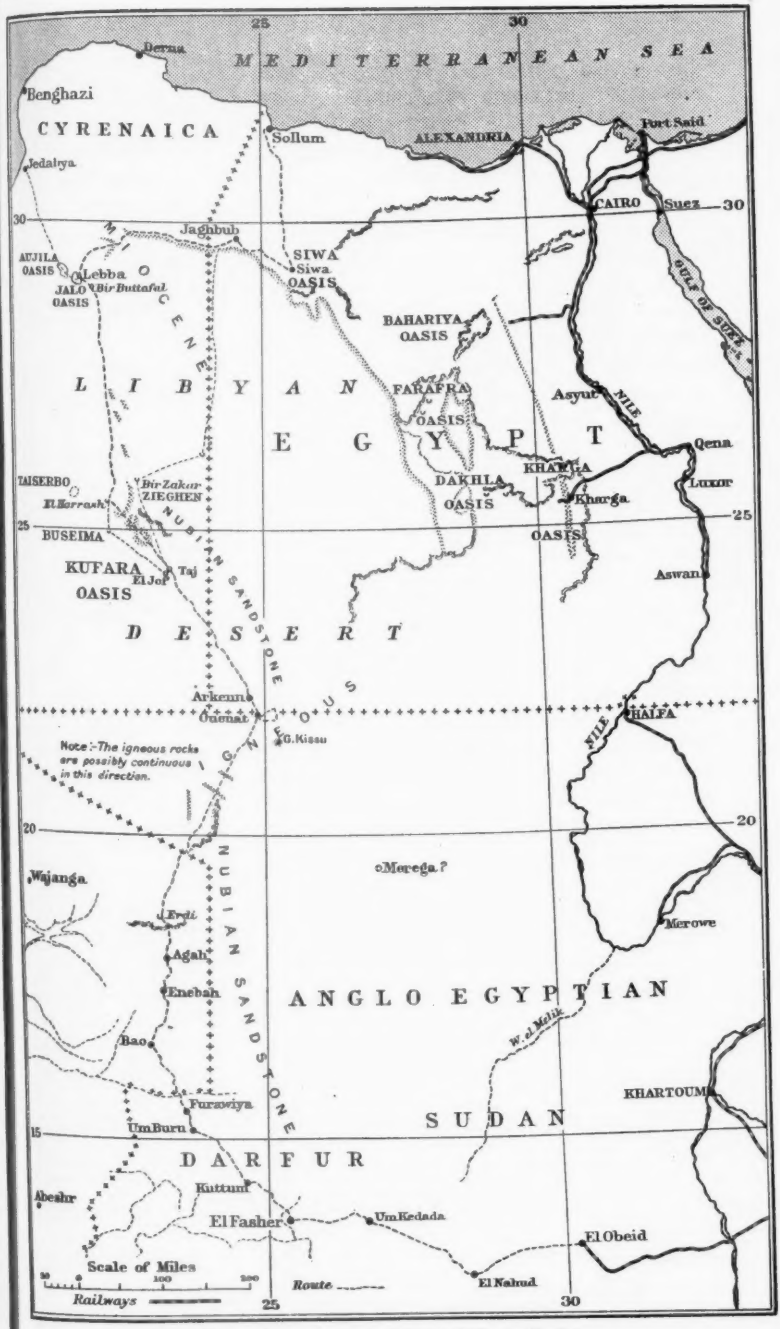
Still another motive urged me to the undertaking. On the previous trip we had taken no scientific instruments, except an aneroid barometer and a prismatic compass. It was not possible, therefore, to make exact scientific observations. In fact we brought back merely the notes for a simple compass traverse of the route, which I had made as best I could with the meagre means at my command.

I was determined then that my new expedition should be equipped with the necessary scientific instruments for surveying the country traversed, and if possible contribute to the geographic and topographic knowledge of the Libyan Desert.

In 1922, therefore, I took my plan for an expedition across the Libyan Desert from north to south to His Majesty King Fuad I. His Majesty met my project with the warmest sympathy and approved the purpose which I had in my mind. He directed that I should be given a long leave of absence from my official duties as an Inspector of the Ministry of Interior. Without his sympathy, approval, and backing it would not have been possible for the undertaking to have met with such success as it was my good fortune to have fall to my lot.

Since Dr. Ball's report on my journey is to be published in the *Geographical Journal*, I have endeavoured to avoid repeating descriptions of the places visited which are included in that report. The section of the report dealing with such places was written by Dr. Ball from the information I gave him, in order to make the report complete and independent as a cartographical and geographical report of the expedition.

The 21st of December 1922 found me at Sollum, a small port on the Mediterranean, close to the western frontier of Egypt. My first objective was Jaghbub, the educational centre of the Senussi brotherhood which lies



Hassanein Bey's route through Kufra to Darfur.

about 130 miles almost due south of Sollum. Just before leaving the little port, however, I learnt from reliable information that the men whose camels I had hired to take me to Jaghbub were engaged in a plot to plunder my caravan on the way. I swiftly broke off my engagement with them, changed my plans, and hired other men and camels to take me to Siwa, from which oasis I would turn and go to Jaghbub.

My caravan left Sollum on 2 January 1923, and I joined it two days later. The trek to Siwa took nine days, the spare time during which was spent in camouflaging the luggage and particularly the boxes carrying the scientific instruments, to look like ordinary Badawi luggage.

On the fifth day, late in the afternoon, I saw a gazelle feeding a little distance off our track. I set out after it, but as I went I heard discouraging shouts and howls from the men behind me. I could not understand their reluctance to have me go after the game, in view of the Badawi's love of meat. I imagined they were afraid that I would be led away to some distance from the caravan and thus hold up their progress to wait for my return. After some chase I got a shot at the gazelle and brought it down.

As I approached the caravan with my game I was surprised again. The men came running towards me with waving arms and shouts of joyful congratulation. Then I learned that among the Badawi the first shot fired at game after a caravan sets out is the critical one. If it is a miss, disaster is certain to overtake the caravan before the journey's end. If it is a hit, fortune will smile upon the whole undertaking. The men of the caravan had been reluctant to see me put our luck to the test so soon. I should have much more than equalled their reluctance had I known what I was doing. If I had remembered the Badawi travel lore, I should have saved my first shot at game until we reached El Fasher six months later!

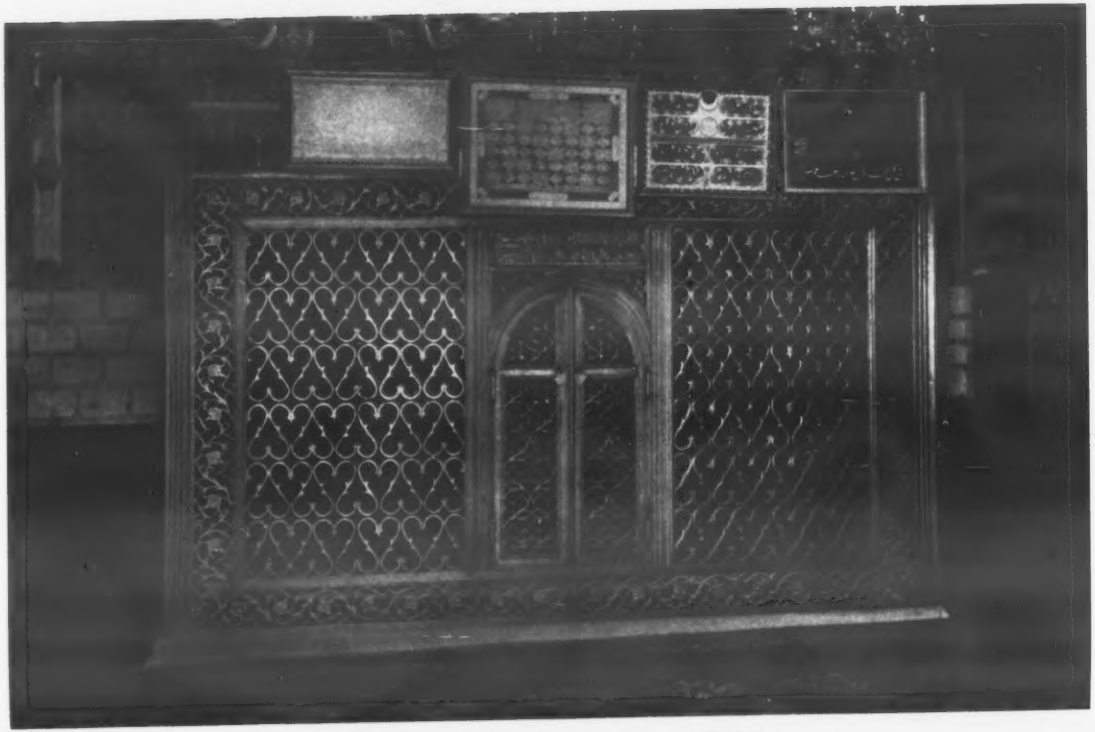
At Siwa I hired other camels and turned westward to go to Jaghbub, a further march of four days. Halfway between the two places I met Sayed Idris himself, who was on his way to Egypt.

He gave me letters of recommendation to his cousin Sayed Muhammad El Abid at Kufra and to his *Wakils* at Jaghbub, Jalo, and Kufra.

My old friendship with Sayed Idris was largely responsible for the success of this expedition, as well as that to Kufra only in 1921. His kind solicitude was one of the essentials of the success of my journeys in the Libyan Desert.

When we said good-bye he gave me and the men of my caravan his blessing for the long journey I was about to make. My men insisted on following to Jaghbub the track which Sayed Idris' caravan had made on coming from that place, although it lengthened the trek somewhat. They considered that our meeting with Sayed Idris was a good omen for the success of my undertaking, and wished to confirm it by marching where he himself had travelled.

THE DOOR LEADING TO THE TOMB OF THE GRAND SENUSSI AT JAGHBUB



THE TOMB OF THE GRAND SENUSSI AT JAGHBUB

At Jaghbub I was warmly received by Sidi Hussein, the *Wakil*, or representative, of Sayed Idris, and by the *Ikhwan*, or "Brethren" of the Sect. I was pleasantly entertained by them and two young members of the Senussi family, the sons of Sayed Ahmed.

Any story of the Libyan Desert would be incomplete without some consideration of the Senussi, the most important influence in that region. The Senussi are not (as many think) a race, nor a political entity. Perhaps the best short description of the Senussi would be a religious order whose leadership is hereditary and which exerts a predominating influence in the lives of the people of the Libyan Desert. The history of the brotherhood may be divided, roughly, into four periods.

The first period is that of the founder Sayed Muhammad ibn Ali El Senussi, known as the Grand Senussi, who was born in Mostaghanem in Algeria in 1785. He came of a Berber tribe of Badawi and was a descendant of the Prophet Muhammad. He received an unusually scholarly education in the Qairwan University, in Fez and at Mecca, and he developed an inclination to asceticism and a conviction that what his religion needed was a return to a pure form of Islam as exemplified in the teachings of the Prophet. At the age of fifty-one he was compelled to leave Mecca by the opposition of the older sheikhs, who challenged his orthodoxy. He returned through Egypt to Cyrenaica and began to establish centres for teaching his doctrines among the Badawi. The Grand Senussi found the Moslems of North Africa fallen into heresies and in danger of rapid degeneration, not only from a religious but from a moral point of view. Some small examples may serve to illustrate this point. At El Jebel El Akhdar, in the north of Cyrenaica, certain influential Badawi chiefs had established a sort of Kaba like the true Kaba at Mecca, to which every Believer who can possibly do so should make his pilgrimage. These founders of a false Kaba tried to establish the theory that a pilgrimage thither was a worthy substitute for the Haj, the authentic pilgrimage to Mecca. Again, the keeping of the month of Ramadan as a time of abstinence and religious contemplation is an important tenet of the Moslem faith. These Badawi would go before the beginning of Ramadan to a certain valley called Wadi Zaza, noted for the multiple echo given back by its walls. In chorus they would shout the question, "Wadi Zaza, Wadi Zaza, shall we keep Ramadan or no?" The echo of course threw back the last word of the question, "No—no—no!"

There were also prevalent among the Badawi remnants of old barbaric customs, such as the killing of female children "to save them from the evils which life might bring."

The Grand Senussi founded his first *zawia* on African soil at Siwa, which is in Egypt close to the western frontier. A zawia is a building of three rooms: a schoolroom in which the Badawi children are taught by the *ikhwan;* the second serves as a guest house in which travellers receive the usual three days' hospitality of Badawi custom; in the third

THE TOMB OF THE GRAND SENUSSI AT JAGHBUB

the *ikhwan* lives Ikhwan is really a plural word meaning "brothers," but the singular of the word is never used, ikhwan having come to be used for one or more. The ikhwan are the active members of the brotherhood, who teach its principles and precepts.

From Siwa the Grand Senussi moved westward into Cyrenaica, establishing zawias at Jalo and Aujila, and onwards through Tripoli and Tunis, spreading his teachings. He returned to Cyrenaica in the year 1838 and established at Jebel el Akhdar a large zawia called El Zawia El Beda or the White Zawia, near Derna, where he settled down and received visits from the leading Badawi dignitaries of Cyrenaica. The Grand Senussi preached a pure form of Islam and a strict adherence to the laws of God and his Prophet Muhammad, making the five daily prayers, giving tithes, making the pilgrimage to Mecca, avoiding lying, slander, robbery, drinking wine, bearing false witness, and other crimes before God. The Grand Senussi was concerned with the religious aspect of life and did not set out to be a political leader or to grasp temporal power.

In the year 1854 the Grand Senussi founded at Jaghbub the zawia which developed into the centre of education and learning of the Senussi brotherhood. His choice of Jaghbub was not accidental, but an illustration of his practical sagacity. It was a strategic point for his plan to bring peace among the different desert tribes. It stood midway between the tribes on the east and on the west who had been in constantly recurring conflict. With his headquarters there the Grand Senussi could bring his influence to bear on the warring rivals and carry out the command of the Prophet to make peace among those about you. The raids made upon each other by the tribes to east and west were brought to an end through his influence, and he settled many old feuds among other tribes in Cyrenaica. Six years after establishing himself at Jaghbub the Zwaya tribe, who had been known as the brigands of Cyrenaica, invited him to come to Kufra, the chief community of their people, and establish a zawia there. They agreed to give up raiding and offered him one-third of all their property in Kufra if he would come to them. He could not go in person, but sent a famous ikhwan who began the dissemination of the teachings of the Grand Senussi among the Zwayas. The Grand Senussi died at the age of seventy four, and was buried in the tomb over which rises the Kubba of Jaghbub. He was succeeded by his son Muhammad El Mahdi.

Sayed El Mahdi was sixteen when his father died, and by the time he reached his majority there were thirty-eight zawias in Cyrenaica, eighteen in Tripolitania, others were scattered over other parts of North Africa and there were nearly a score in Egypt. It has been estimated that between a million and a half and three million people owed allegiance to the brotherhood when El Mahdi became its active head. He saw that there was more scope for the influence of the brotherhood to the southward, and in the year 1894 he removed his headquarters

from Jaghbub to Kufra. This marked the beginning of an important era in the history of the Senussi, and also in the development of trade between the Sudan and the Mediterranean coast by way of Kufra. Under the rule of the Zwaya tribe of Badawi, who had conquered Kufra from the black Tebus, the group of oases was the chief centre of brigandage in the Libyan Desert. Each caravan going through Kufra north or south was either pillaged or, if lucky, compelled to pay a route tax to the Zwayas. El Mahdi realized the importance of developing the trade of the oases and of the routes across the Libyan Desert. He induced the Zwayas to give up the exacting of tribute, and so strove to make desert travel safe that, it was told me at Kufra, in his day a woman might travel from Barka (Cyrenaica) to Wadai unmolested. Ikhwan, too, were sent forth to establish zawias from Morocco as far east as Persia. But his greatest work was in the desert, where he made the Senussi not only a spiritual power, and a powerful influence for peace among the tribes, but a strong mercantile organization under whose stimulus trade developed and flourished. He had gone southward to Ġeru to extend the influence of the brotherhood when his death came suddenly in 1900.

The sons of El Mahdi were minors in school when he died, and his nephew Sayed Ahmed was made the head of the brotherhood and the guardian of Sayed Idris who, as the eldest son of El Mahdi, was the legitimate successor. The new head of the Senussi made an abrupt departure from the policies of his predecessors. He sought temporal power through force rather than spiritual and mercantile influence through peaceful methods. He first antagonized the French, who were beginning to penetrate Wadai, but he was defeated and compelled to withdraw to Kufra. When the Italians took over Cyrenaica and Tripoli from the Turks, Sayed Ahmed attempted to unite his spiritual power as head of the brotherhood with the remnants of temporal and military power left by the Turks. Then the Great War broke out and he allowed himself to be persuaded by Turkish and German emissaries to attack the western frontier of Egypt. The effort was a complete failure and Sayed Ahmed was compelled to take flight to Constantinople in a German submarine. The Grand Senussi and his great son had realized that a spiritual leader cannot be beaten on his own ground, whereas if he takes the field in quest of military supremacy it requires only a few military reverses to destroy his prestige. Sayed Ahmed surrendered the spiritual influence that had radiated from his predecessors to rely upon arms, ammunition, and circumstances. When these failed there was nothing left.

The Senussi leadership then fell to the lineal successor, Sayed Idris, who derives much of the prestige he undoubtedly possesses from the fact that he is the son of El Mahdi. His own personal qualities would in any case be an adequate foundation for success in his difficult position. He combines gentleness of disposition with firmness of character in a

high degree. In 1917 an agreement was entered into by Sayed Idris and the Italian Government by which his right to administer the affairs of the oases of Jalo, Aujila, Jedabya, and Kufra was expressly recognized. Unfortunately in 1923 a misunderstanding between the parties to this agreement caused it to lapse. It is to be hoped, however, that a new arrangement will be entered into which will restore to these oases of the Libyan desert their peace and prosperity.

It was over a month before I could get away from Jaghbub. There was great difficulty in getting camels to take me to Jalo, where I should set out on the direct trek to Kufra. The route from Jaghbub to Jalo is largely the preserve of the Zwaya and Majabra tribes, and all persuasion failed with the neighbouring tribes to make them hire their camels to Jalo.

At last a Zwaya caravan coming from Shekherra, the Zwaya village near Jalo, arrived at Jaghbub on its way to Siwa to get dates. I lost no time in informing the heads of the caravan that the Egyptian Government had forbidden all Zwayas to enter Egyptian territory until they had settled the feud between them and the tribe of Awlad Ali, who live in Egyptian territory—a fact which I luckily learnt at Siwa.

There was nothing for them to do but go back to Shekherra, and they finally agreed to take me and my outfit to Jalo. I had four men of my own by this time—Abdullahi and Ahmed, Egyptian Nubians whom I had brought from Cairo; Hamad, engaged at Sollum; and Ismail, whom I picked up at Siwa.

In spite of my anxiety to be on the road, I enjoyed the peaceful atmosphere of Jaghbub thoroughly during my thirty-four days' stay there.

I left Jaghbub in accordance with the best Badawi tradition. It was a day of sandstorm. The Badawi say that to start a journey in a sandstorm is good luck. I am not sure though that they are not making a virtue of necessity.

From Jaghbub to Jalo is a seven days' trek, but we were obliged to do the journey in twelve on account of the severe sandstorms which we encountered. At this time of the year sandstorms are a commonplace in the desert, but as an experience there is nothing commonplace about them.

The day dawns with a clear sky and no hint of storm or wind. The desert smiles upon our setting out and the caravan moves forward cheerfully. Before long a refreshing breeze comes up from nowhere and goes whispering over the sands. Almost imperceptibly it strengthens, but still there is nothing unpleasant in its blowing. Then one looks down at one's feet and the surface of the desert is curiously changed. It is as though the surface were underlaid with steam pipes, with thousands of orifices through which tiny jets of steam are puffing out. The sand leaps in little spurts and whirls. Inch by inch the disturbance rises as the wind increases its force. It seems as though the whole surface of the desert

were rising in obedience to some upthrusting force beneath. Larger pebbles strike against the shins, the knees, the thighs. The spray of dancing sand grains climbs the body till it strikes the face and goes over the head. The sky is shut out, all but the nearest camels fade from view, the universe is filled with hurtling, pelting, stinging, biting legions of torment. Well for the traveller then if the wind is blowing at his back! The torture of the driving sand against his face is bitter. He can scarcely keep his eyes open, and yet he dare not let them close, for one thing worse than the stinging of the sand grains is to lose one's way.

Fortunately the wind comes in driving gusts, spaced in groups of three or four, with a few seconds of blessed lull after each group. While the gusts are making their assault, one turns one's face away, pulls one side of one's *kufia* forward like a screen, and almost hold one's breath. When the lull comes, one puts the *kufia* back, takes a quick look about to see that one has kept one's bearings, then swiftly prepares for the next attack.

It is as though some great monster of fabled size and unearthly power were puffing out these hurtling blasts of sand upon the travellers' heads. The sound is that of a giant hand drawing rough fingers in regular rhythm across tightly stretched silk.

When the sandstorm comes there is nothing to do but to push doggedly on. Around any stationary object, whether it be a post, a camel, or a man, the eager sand swiftly gathers, piling up and up until there remains only a smoothly rounded heap. If it is torture to go on, it is death itself to halt.

A sandstorm is likely to be at its worst for five or six hours. While it persists, a caravan can only keep going with careful vigilance that the direction be not missed. When the storm is at its fiercest, the camels will be scarcely moving, but their instinct tells them that it is death to halt. How well they know the truth is proved by the fact that when it begins to rain the camels immediately stand still and even lie down.

The storm drives the sand into everything one possesses. It fills clothes, food, baggage, instruments, everything. It searches out every weak spot in one's armour. One feels it, breathes it, eats it, drinks it, lives it—and hates it. The finest particles even penetrate the pores of the skin, setting up a distressing irritation.

After Bu Salama Well, which is a day's trek from Jaghbub, we were going through a region where there were remains of a petrified forest. At intervals we passed great blocks of stone erect like guide posts along the way. Ages ago they had been living trees, but now the forces of nature had transferred them from the vegetable kingdom to the mineral. A few smaller bits of petrified wood were scattered about, but most of these were hidden beneath the sand. The larger tree sections had remained visible because the etiquette of the desert demands that any one passing such a fallen landmark shall set it erect again.

On March 5 we arrived at Jalo. Jalo is one of the most important oases in Cyrenaica, partly because of the dates which it produces, but more especially because it is the trade outlet for the products of Wadai and Darfur which come through Kufra. Ivory, ostrich feathers, and leather from Wadai and Darfur come to Jalo to be forwarded either eastward to Egypt or northward to Benghazi.

The trade is chiefly in the hands of the Majabra tribe, whose headmen are the merchant princes of the Libyan Desert. A Majbari (singular of Majabra) boasts that his father died on the *basur* (camel's saddle) in the same way that a soldier boasts that his father died on the field of battle.

Jalo is always the place for adding the finishing touches to caravans going to Kufra. On the previous trip to Kufra in 1921 the problem of providing camels, their fodder, men, and food and equipment for the men did not arise, as the whole caravan was produced complete and provided for by the generosity of Sayed Idris, a fact which had a considerable effect in lulling the suspicions of the Badawi and subduing their hostility to strangers. On this occasion I had to arrange for the camels and personnel, and so big a caravan journeying with the quantity of unusual luggage necessary for a long journey naturally aroused curiosity.

A serious handicap on this trip, moreover, was the necessity for carrying and employing a number of instruments upon which depended the scientific success of the expedition.

The previous trip had the advantage of being carried out at the proper season, but unforeseen delays and the extent of the ground to be covered made it impossible for me this time to accomplish every section of the trip at the right season of the year.

I spent ten days at Jalo in making further preparations for the long waterless trek to Zieghen Well, just north of Kufra, and in receiving and returning the hospitality of the notables of the oasis.

An even more important part of my activities there was the making of the scientific observations. I observed the sun and the stars for determining the latitude and longitude, and took regular readings of aneroid barometer and thermometer for the determination of the altitude. My observations on the latter point, when finally worked out in relation to barometric records made on the same days at Siwa, disclosed the interesting fact that the level of Jalo is 60 metres higher to-day than it was when Rohlfs ascertained it in 1879. He found Jalo almost exactly at sea-level; I found it 60 metres higher. I saw the explanation of it going on before my eyes. The drifting sands were climbing slowly up the trunks of the date trees and against the walls of the houses, threatening to engulf them. Some of the inhabitants had already moved their houses and rebuilt them on higher levels. The house I was living in, and in which I took the barometric readings, was from 15 to 20 metres above the buildings of the village. It is the steadily accumulating sands, driven

by sandstorms and gathering wherever trees and houses stop its progress, that have raised Jalo steadily above sea-level to the line of nearly 180 feet in forty-five years.

In the taking of my observations I had to be cautious, for the Badawi are suspicious of anything so elaborately scientific-looking as a theodolite. They were sure to say that I was making a map with a view to coming back and conquering their land. The first time that a Badawi chief and the man who was to guide us to Kufra caught me at my theodolite, I had to explain hastily and persuasively that I was getting data for the making of a calendar for the month of Ramadan.

Abdullahi, who was of course not a Badawi, was invaluable to me in the camouflaging of my scientific activities. In fact he was rather a specialist in the manufacture of those little inaccuracies that smooth the path of life and preserve the social amenities. One day we were taking theodolite observations at Jalo from some distance away. A native demanded what we were doing, and Abdullahi said we were taking a picture of the town. "How can that be, at such a distance?" demanded the Badawi. Abdullahi had his explanation ready. "The box attracts the picture, so that it comes right out and flies into it," he asserted glibly. "But how can a box attract a picture?" demanded the incredulous Badawi. Abdullahi struck an attitude. "Ask the magnet how it attracts the iron," he commanded rhetorically, and the debate was closed.

On Thursday, March 15, we set out for Kufra. We spent a day at Buttafal Well, 30 kilometres from Jalo, to make sure that all was in good order for the trek. My caravan now consisted of thirty-nine camels, twenty-one men, a horse, and a dog.

We set our faces southward and journeyed toward Kufra. It was hot and windy, and the desert lay about us like an interminable French pancake. The ground was flat hard sand with a little gravel scattered over it. Our first objective was the Zieghen Wells, which we ought to make in eight or nine days. In the old days, before the times of the Senussi, it had been the custom to make the trek in three days and five nights, marching continuously without a stop for food or rest. But the Senussi changed all that. They inaugurated the custom of taking enough water and food to permit the journey to be made in twice the time, with adequate rest for camels and men each day.

On this trek we met flocks of small birds winging their way northwards, some of them were exhausted from thirst, and eagerly accepted the water we offered them when they perched on our hands.

A typical day's trek in this part of the desert at this time of year would run something like this. Although it is March, it is still cold in the morning and one gets up a little after dawn because it is too cold to stay abed longer. Even the sleeping-bag and the Badawi blanket will not keep out the chill. A peep through the flaps of the tent shows that the east stars are paling in the sky. Some one has the fire already

started and the first impulse is to get to it without delay. Throwing my *jerd* about me and wrapping the *kufia* about my ears I dash out to the crackling blaze. There is nothing hot about the desert in these crisp morning hours. I stand by the fire and have a look round. There is little life in the camp yet, though all the men are up. They are huddled close to the warmth, muffled in jerds and every other garment that they can lay their hands on. When water is plenty, smoking hot glasses of tea are handed round, and after they are drunk the activities of the camp commence. Two camel-men go to feed the camels with dried dates, which the beasts munch reflectively, stones and all. A consultation is sometimes held over the camels, if some of them have suffered the previous day from too heavy loads. Perhaps a shifting of loads is decided on or better packing and loading recommended.

Other men are pulling down the three tents, which stand at the apexes of a triangle, with the camels parked at its centre. The luggage which had been set up as a barricade against the icy wind is sorted out and arranged ready for the loading.

Meanwhile I have been attending to the barometer and thermometer, registering their readings, filling in the spaces in my scientific diary, seeing that the cameras have fresh films. The voices of the men sound low through the camp, muffled by kufias and extra clothing. At last breakfast is ready.

It may be *asida*, the Badawi national dish, a kind of baked pudding of flour, water, and spices; or it may be rice. It is an utterly simple meal in either case, but with what a keen appetite one attacks it! In the desert any disinclination to the first meal of the day that one may feel in city surroundings vanishes away. Breakfast ends with the inevitable three glasses of tea, taken slowly and reflectively. Whatever you do, do not deprive your men of their tea or hurry them over it. Give a Badawi a filling meal and let him sip three glasses of tea after it, and you can get any work out of him that you want Stint him or rush him, and you will get worse than nothing.

After breakfast every one is warm and contented and ready to work hard. The loading goes on swiftly, diversified at times by the antics of the two or three young and frolicsome camels that seem to get into every caravan. These young fellows resist being loaded and even throw off their loads when the job is apparently all done. An extra half-hour spent now may save two or three hours' delay on the road later, caused by slipping of the loads or improper distribution of the burdens.

When the caravan is all but ready, I have a few words with the guide about the direction of our day's march. He draws a line on the sand and says that there lies our way. I take a bearing of the line by my compass, a proceeding which doubtless seems to him an absurd if harmless idiosyncrasy of the Bey. On the whole the precaution proves unnecessary, however, for Senussi Bu Hassan goes as straight to his mark

THE COURT OF THE MOSQUE JAGHBUB

THE "KUBBA" OR DOME OF JAGHBUB

EL HARASH WELL AT ZIEGHEN

THE LAKE AT KUFARA

SAYED EL ABID'S HOUSE AT KUFARA

as a homing pigeon. Only in the middle of the day he sometimes wobbles a bit. He travels by his shadow and, as he explains, "when the sun is high and the shadow lies between my feet, my head goes round." There is one other hour of the day when the guide's task is a perplexing one. In the twilight hour between the setting of the sun and the appearance of the stars, all directions on the desert's vast disc are the same. Then sometimes the compass comes in handy. Once, by means of the bearing I had taken in the morning, I caught the guide in the hour between sun and stars going almost 90° off direction. But, taken all round, the accuracy with which a good guide like Senussi Bu Hassan steers his course is almost uncanny.

Our conference over and the last camel loaded, the guide sets out ahead and one by one the camels follow. The men of the caravan have a last warm-up of hands and feet at the dying fire, thrust their feet into the Badawi shoes and hasten after the camels, singing gaily. The sun is getting warm by now, and unless there is a strong wind blowing from the north, one disposes quickly of wrappings on ears and neck, and finally the jerd. The extra garments are flung on the backs of the camels, jokes begin to crack, foot races are run, and everybody is happy to be alive. Gradually the men sort themselves into groups of two or three, spaced at intervals along the caravan, chatting about their own affairs or about things in general. Sometimes I walk at the head of the caravan and again some distance behind it, to keep an eye on the direction it is taking and especially to enjoy the sense of solitude and remoteness.

So the morning passes and at midday food is passed around. There is no halt for lunch, as the camels eat only twice a day. If we have just left an oasis, there is fresh bread, half a loaf or even a whole one to each man, with dates. Later on that fresh bread becomes hard bread, and still later no bread at all. But always there are dates.

I had one camel fitted up with a tent over its back so that one may lie and take one's ease when tired of walking. Ahmed called it "the Club." One day at the lunch hour Abdullahi demanded where I was and whether I had had my portion of bread and dates or not, and Ahmed replied, with a twinkling eye in an otherwise grave face, "The Bey is lunching at the Club to-day."

It is quite possible to have a good nap on the camel's back, and an occasional ride is not to be scorned. But generally one walks, for the camel's pace of 2½ miles an hour is an easy one to keep up with, and riding is often more tiring than walking.

In the afternoon there are several hours of heat, the pace of the camels slackens and the whole caravan becomes quiet and somnolent. As evening comes on it grows cool again and then the camels pick up their speed and go into a final spurt before the time for making camp. The men sing to the camels then to stimulate their efforts, and the beasts respond cheerfully to the encouragement.

At sunset I make it a point to be near the guide and unobtrusively to check him with my compass in those uncertain hours before the stars come out. When the dark falls a lantern is lighted and given to the guide. Then we follow that elusive pin-point of yellow in the darkness. The camels like to have the lantern ahead of them and move briskly forward in pursuit.

Twelve to thirteen hours of walking, if conditions have been good, bring us to the end of the day's trek, though sometimes we cannot go on so long. The order is given to halt, the camels, with grunts of satisfaction, kneel to have their loads removed. Now we must be vigilant, for men tired by a day's trek are likely to be careless and let boxes with precious instruments or cameras fall with disastrous violence. The luggage is arranged in a barricade, if the night promises to be windy, and the tents are pitched in their triangle.

Then the fire is built and the first thing is tea. Now I realize to the full the virtues of the black, sweet, sticky mess that the Badawi know by that name. They make tea by taking a handful of the leaves and a handful of sugar and boiling them briskly in a quart of water. The result would drive a housewife of the West almost insane, but it is a wonderful stimulant after a hard day's trek in the desert, and a glorious reviver of one's energies and spirits.

The men of the caravan are not slow to prepare and eat the evening meal, to feed the camels and then to dispose themselves for sleep. But I must compare my six watches and wind them, record the photographs and geological specimens taken and collected during the day, change the cinema films in the darkness, and write up my diaries.

On March 26 we reached Zieghen Well, where we were kept for a day by a severe sandstorm.

The changes which time produced in the desert, which we are accustomed to think of as eternally the same are interesting. When Rohlfs passed to the westward of Zieghen on his way to Kufara in 1879 he reported a broad stretch of green vegetation here. To-day there is no extent of such vegetation at Zieghen, merely a few palm trees at El Harash Well, and a great deal of *hatab*, dead brushwood. Rohlfs' statement, however, is confirmed by Bu Helega, an old Zwaya of Kufra, who says that when he was a child his father used to take him to Kufra when he went to get dates, because the Badawi believe that the water of Shekherra, the headquarters of the Zwayas near Jalo, is bad for children in the summer. Bu Helega used to be carried on his father's back most of the way. It was in those days that the trip was made in three days and five nights without halts. When they reached the latter place the beasts were fed on the green grass that was growing there then. What has seemed like an error on Rholf's part in describing so much vegetation at Zieghen from hearsay is thus demonstrated to be merely the result of a difference in conditions after forty-five years. It is pre-

sumably a variation in the water conditions in the soil which has turned the living shrubs into firewood.

Our trek from Buttafal to Zieghen had illustrated the uncertainties of desert travel. In spite of all the precautions that we could possibly think of, our fuel ran out, one camel died, and two others were so exhausted that they were to fail us soon. The food for the camels was used up also, and from Zieghen to Kufra they were fed on date-tree leaves, gathered at the former place, very poor food for camels.

On the two evenings at Zieghen I took observations of the sun with the theodolite. When the observations are worked out it appears that Zieghen is about 100 kilometres farther to the east-north-east than Rohlfs had placed it. He did not make observations on the spot, but relied on what his guides told him when he was at Taiserbo. I found that Zieghen is 310 metres above sea-level.

From Zieghen a four days' trek took us to Hawari, the northernmost oasis of Kufra. Two days after leaving Zieghen we encountered the worst sandstorm that I have ever experienced. About 3.30 a.m. the wind started suddenly, and a short while afterwards the gale swept all the tents from their moorings. Mine collapsed on top of me, and with the constantly growing load of sand weighing it down, I was threatened with suffocation. Fortunately I got hold of a tent-peg with which I held the canvas away from my face. I lay in my uncomfortable position under the tent for two hours. The sand came hurtling through the gap in the tent like shot from a gun. The men and the camels suffered badly.

In the morning I found most of the instruments in use smashed, as well as my small chronometer. Had the tent-pole fallen a fraction of an inch to one side and smashed my big chronometer, the scientific results of the expedition would have been seriously affected. This shows to what extent luck plays an important part in an explorer's work. After a day's rest at Hawari we proceeded to Kufra.

The approach of Kufra from the north has an element of surprise in it that makes it doubly interesting. We marched through gently rolling country with an irregular ridge of no great height forming the horizon. Suddenly the top of the ridge resolved itself into the outlines of a group of buildings, their walls hard to distinguish at any distance from the rocks and sands they match so well in colour and in form. This is El Taj, the headquarters of the Senussi family in Kufra. As we enter the town, we see that the ground drops abruptly away beyond it, down to the valley of the Kufra. This pleasant valley is a shallow, roughly oval bowl, 40 kilometres on its long diameter in extent and up to 20 kilometres on the short one. It is dotted with palm trees, and across it in an irregular line from north-east to south-west are strung the six settlements of Boema, Buma, Jof, El Zurruk, Tallalib, and Tollab. Near Jof lie the blue shimmering waters of a lake of large extent. At this mid-point in the sand waste of the desert this expanse of water is

both a boon and an aggravation. Unfortunately its waters are salt. However, one can swim in it with a pleasure unknown in the land of sea and river and bath-tubs.

On our entry into El Taj I was met cordially by old friends. Sayed El Abid, the cousin of Sayed Idris and the chief Senussi in Kufra, was ill with gout, but Sidi Saleh El Baskari, the Kaimakam, Sidi Mahmoud El Jeddawi, Sayed Idris' *wakil*, and several Ikhwan brought words of welcome from him and conducted me to the house of Sayed Idris where I was to stop. It was here that we lived on the first trip to Kufra two years before, and immediately I felt at home.

I had just time for a short rest before a slave came to take me to the house of Sayed El Abid for dinner. Led by the same messenger who came for me two years ago, I walked through the same narrow streets, and entered the same wonderful house of the Senussi leader with a curious feeling, as though time had stood still or gone back. El Abid's house is a labyrinth of corridors lined with doors, behind which live the members of his family and his retainers. We passed into the familiar room whose spaces seemed more richly adorned than ever with gorgeous rugs, many-coloured cushions and stiffly embroidered brocades. On the walls hung the well-remembered collection of clocks, barometers, and thermometers in which my host takes naïve delight. The clocks, of which there are at least a dozen of assorted shapes and sizes, were all going strong, and when they struck the hour, they very much reminded me of Oxford, with the endless variety of tones coming from all the church towers of the University town. Sidi Saleh El Baskari came to bear me company and to apologize for the enforced absence of my host, Sayed El Abid. There was set before me a feast fit for the gods, or for mortals fresh from the monotonous living of the desert—lamb, rice, vegetables, delicious bread, rich Badawi cakes, sweet vinegar, sour milk, followed by coffee, milk with almond pulp beaten in it, and finally the ceremonial three glasses of tea, flavoured with amber, rose-water, and mint.

After a day's rest I started exploring the valley of Kufra. I visited the villages, the *Suk* where the weekly market is held, and the *Zawya* at Jof, which is the oldest Senussi school and the first building erected in Kufra.

It was interesting to find side by side in the Suk rifle cartridges whose marking shows them to be thirty years old, Italian tomato sauce in tins from Benghazi, blue and white calico from Egypt, and leather, ivory, and ostrich feathers from Wadai. These products of the south, however, are not plentiful now in Kufra, except when a merchant who has brought them from Wadai is prevented for some reason from going on to the north to sell them in Egypt or Cyrenaica.

Kufra had seen its best days as a trade centre before the occupation of the Sudan. Then it was easier to find an outlet for the products of Wadai and Darfur through Kufra than by way of the country to the east. Even now, however, there is a contraband trade through Kufra

in female ivory and ivory of less than fourteen pounds weight, the exportation of which is prohibited by the Sudan Government.

In addition to the trade that passes through Kufra, most of the big Zwaya chiefs go in for agriculture. They raise barley and maize. The Senussi are more progressive, and grow melons, grapes, bananas, marrows, and other vegetables of the more delicate kinds, all of which are a great treat after the monotonous fare of the desert. They also raise mint and roses, from which they make rose-water and mint essence, so essential in their ceremonies of hospitality. From a few olive trees some olive oil is produced in primitive presses. But dates are the main item in the Badawi's diet, and there are many date trees all through the Kufra Valley. Dates are the only article of exportation from the oases, but for other commodities, whether for food or clothing, Kufra is mainly dependent on the outside world. Tea, sugar, rice, flour, and white calico are the main imports of Kufra.

The Badawi live a simple and primitive life, sheltered in houses built of stone, plastered and whitewashed inside. A roughly made divan, covered with cushions and Badawi rugs, made in the north, is the only furniture one comes across in these small houses. In a rich man's house the reception room is covered with Persian rugs and expensive silk cushions. A gramophone with discs of Arab songs by Egyptian singers is the rich man's luxury.

Manual work is done mostly by slaves. The price of slaves, I learnt at Kufra, has risen a great deal during the last few years because there are no more slaves coming up from Wadai on account of the vigilance of the French authorities in that province. On one of my journeys in 1916 I was offered a slave-girl for six gold louis (120 francs); now the price varies from £30 to £40. A male slave costs less. The Badawi sometimes marry their slave-girls, and if one of these bears a male child she automatically becomes free. The Badawi have no prejudice against colour, that is, if a slave bears the head of a tribe his eldest male child, that child *ipso facto* becomes in his turn the head of the tribe, however black he may be. On the whole slaves are well treated by the Badawi. They are well dressed, for an ill-dressed slave reflects badly on his master. The favourite slave of Sayed Idris, Ali Kaja, is not only the most trusted man of Sayed Idris, but he has more power and authority among the Bedawi themselves than many a free man. A man-slave is permitted to buy a slave-girl. Once when I asked Ali Kaja about the price of slaves, he complained: "They are very expensive nowadays. The other day I bought one and she cost me forty golden sovereigns." He said it with such an air that he might never have been a slave himself.

I spent nearly three weeks at Kufra, royally entertained by Sayed El Abid and other notables of the place.

The net result of my scientific observations during this stay, when

they have been finally reduced after my return to Egypt, is that Kufra is some 40 kilometres south-south-east of the position assigned to it by Rohlfs from Stecker's observations. I find the altitude of Kufra to be almost precisely the same as that ascertained by Rohlfs, 400 metres for Boema, on the floor of the valley, and 475 metres for El Taj on the valley's rim.

Soon after I arrived I heard news that compelled me to make a radical change in my plans. I had proposed to go south from Kufra by way of the regular trade route to Wadai, which had not yet been traversed by any one from the outside world. But I learned at Kufra that a French patrol had come from Wadai, about half the distance to Kufra, reaching Sarra Well. There were also vague stories of the two "lost" oases of Arkenu and Owenat lying well to the eastward of the trade route to Wadai. Those oases were almost mythical, situated as they are on no route that is travelled even by Badawi or blacks. I determined that I would go to the Sudan by way of the "lost" oases. If I could make my way to them and place them definitely on the map, it would be something worth while doing. I found it easier to make up my mind to try the new route than to set out upon it. Bu Helega, the owner of the camels I had hired at Jalo to take me to Wadai, refused point-blank to go by way of Owenat. He was not prepared to face the perils that he believed to exist in those unfrequented regions, and he was unwilling to let his camels or his men go that way. He brought to me Suliman Bu Matari, a rich Zwaya merchant, who had discouraging words to say about the route I wished to take. "Eight years ago," said Bu Matari, "the last caravan to go that way, of which my brother Muhammad was the leader, was 'eaten up' and slaughtered on the frontiers of Darfur. They went, not as you wish to go, but by the easier route from Owenat to Merega (a small oasis about 300 kilometres south-east of Owenat). This journey you propose to make is through territory where no Badawi has passed before. The *daffa* (an extended waterless trek) between Owenat and Erdi is a long and hazardous one. God be merciful to the caravan in such heat. Your camels will drop like birds before the hot south winds. Even if you get through safely, who knows how the inhabitants of the hills over there will receive you? Do not let your anxiety to travel fast overrule your wisdom and prevent you from choosing the safe trade route to Wajanga and Abeshr."

I thanked him for his advice, but I knew that I would not take it. Two days later Bu Helega and I argued the matter out at great length, but neither succeeded in convincing the other. Eventually the difficult situation was solved. He realized that I was determined to go by way of Owenat; he learned that Sayed El Abid, the chief Senussi in Kufra, was not opposed to my plan; and he was attracted by my consenting to take fewer camels at the same price. He agreed to try to find some men to go with me as camel-men.

At last the real start has been made. Before me all is unknown, full of the mystery and the fascination that lie in those parts of the Earth's surface yet untraversed by men from the outside world.

(*To be continued.*)

THROUGH BHUTAN AND SOUTHERN TIBET

Major F. M. Bailey, I.A., Political Official in Sikkim

Map follows page 352.

THE presentation of the insignia of the G.C.I.E. to His Highness the Maharaja of Bhutan gave an opportunity for the journey described herein, through portions of Bhutan and Tibet hitherto quite unexplored, or only visited by the secret explorers of the Survey of India in the 'eighties of last century. We had the great advantage, denied to our predecessors, of being accompanied by a survey party under Captain Meade, who worked with the co-operation of the inhabitants, and were able thus to use plane-tables, theodolites, and other instruments openly. All Tibetan and Bhutanese names for the map were transliterated by the recognized system from names written on the spot, so, though the English spelling of some names has been changed, it is hoped that further changes will not be necessary.

In October 1921 a meeting had been arranged in Paro between the Maharaja and our President, when he was Governor of Bengal, at which the insignia were to be presented ; but an outbreak of influenza in Bhutan prevented His Highness from coming to meet Lord Ronaldshay.

Parts of the route from the Chumbi Valley to Bumtang had previously been followed by several travellers from Bogle in 1774 onwards, but the only people who had actually travelled the whole distance were Mr. Claude White and his party in 1905. He described the country in a paper published in the *Geographical Journal* for January 1910.

Travelling leisurely, our journey from Chumbi, or Yatung as it is now called, to Bumtang occupied us from 20 June to 19 July 1922. Since the main range of the Himalayas forms the northern frontier of Bhutan, dividing it from Tibet, a journey from west to east through Bhutan necessitates crossing a series of subsidiary ranges which run south from the main range. In each of the main valleys between these ranges is one of the large dzongs or castles from which the country is governed. Our first pass was the Kyu La (14,150 feet) leading from the Chumbi Valley to the valley of the Ha Chu, with Ha Dzong (9100 feet). We then crossed the Chilai La (12,400 feet) leading to the Paro Chu Valley, in which is Paro Dzong (7750 feet). Our next pass was the Bela La (11,600 feet) leading to the valley of the Timbu Chu, in which is Tashichö Dzong (7800 feet). The waters of these three valleys, Ha,

Paro, and Timbu, unite in Bhutan and reach India as the Ridak. Then followed the Dokyong La (10,400 feet) leading to a valley which contains the upper waters of the Sankos, and in which are Punaka (5150 feet) and Wangdü-potrang. The pass east of this is the Pele La (10,950 feet), leading to Trongsa (7100 feet), and between this and Bumtang (9725 feet) was the Yuto La (11,210 feet). All of these valleys drain into the Manas. A glance at the above figures will show the switchback nature of the road.

We spent several pleasant days at each of the big dzongs we passed. At Ha an afternoon was spent in archery with the Bhutanese officers, whom we found to be very expert, though the bows required great strength to pull. The distance was 130 yards. A hit on the target counts two, and an arrow in the ground one arrow's length from the target one point.

Nothing could have exceeded the kindness of the Bhutanese to us on the road. The roads themselves had been repaired and beautiful camps arranged at every halt, in which in some places huts had been built for us : in others we pitched our tents, while our followers lived in sheds which had been put up for them. Our camps were surrounded with fences of silver fir and pine trees to keep out the curious public.

The vegetation was wonderful : in places dense forest of pines and firs, while higher up were slopes covered with the most beautiful Alpine flowers, blue and yellow poppies, primulas, ground orchids, etc. The most striking flower was a magnificent lily (*Lilium nepalense burmanicum*), which we found in great quantities during two days' march at a height of about 9900 feet. We sent men later to bring in bulbs, of which many have been planted in our garden at Gangtok, while a few are being grown at Darjeeling and Edinburgh.

At Paro we were met by a bodyguard of men in picturesque blue uniform with steel helmets and armed with thoroughly efficient Bhutanese swords. With them were two dancers, who with small drums danced before us wherever we went during our stay at Paro. Here we saw a very fine dance of lamas in the most gorgeous costumes. We also saw some beautiful religious pictures, not painted as is usually the case in Tibet, but wonderfully embroidered. Near one of our camps lived the incarnation of a former ruler of Bhutan, a very holy man ; but, as mice had damaged the image of his first incarnation, he was obliged to undertake silent meditation for three months, and we could not see him.

We reached Bumtang on July 19. Here we were met by H.H. the Maharaja, and conducted over strips of scarlet kinkob to a beautiful camp in which painted huts had been constructed, shrubs and flowers planted, and turf laid down. Our table-cloth was of white silk with gold patterns. Here we spent twelve days as guests of the Maharaja. He is a fine old man whose young days were spent in fighting his various enemies. I had met him when, as the Bhutanese representative, he accom-

PARO VALLEY, BHUTAN

BHUTANESE ESCORT AT PARO

END OF GLACIER NORTH OF KULAKANGRI GROUP

CROSSING GLACIER ON THE MONLAKARCHUNG PASS

panied Sir Francis Younghusband to Tibet in 1904, on which occasion he was very useful as a go-between with the Tibetans. He is the first hereditary Maharaja of the country. We also saw a lot of his family, and some of them had their meals with us during our stay.

There is a school at Bumtang in which English is taught, and a number of boys are being educated in India. His Highness hopes that these boys will later be trained as doctors, veterinary surgeons, foresters, teachers, engineers, etc., and inaugurate efficient branches of administration in these and other lines.

At Bumtang, and at other places at which we stopped, we played the people at cricket (with a tennis ball) and at football, which furthered friendly intercourse. These games were very popular, and recently Bhutanese hockey and football teams have come to play against Sikkim in Gangtok. The absence of caste and the freedom of women makes it as easy to form real friendships with these people as with Tibetans. His Highness' daughters were frequent visitors to our camp, and we were shown round a weaving factory in their house.

Near Bumtang is a very holy temple called Kuje, meaning, in the honorific language of the country, "body print." Here about twelve hundred years ago the Indian saint Padma Sambhava, called Lopon Rimboche in Tibet and Bhutan, spent some time when he was converting the country to Buddhism. He lived in a cave, and for long periods would come out and sit up against the rock meditating: the result was a deep imprint of his body against the rock. Against this holy rock a temple has been built, and the cave and the imprint are behind the altar. Above the temple is a large juniper tree which tradition says grew from the saint's staff which he stuck in the ground. This temple was at first chosen for the ceremony of the presentation of the G.C.I.E., but later it was thought that, owing to its age, it might not be safe for a large number of people to congregate in its upper storey, where the cave was, so a newer temple alongside was chosen.

Hither, when the lamas had chosen a lucky day, we rode out and witnessed an interesting ceremony. After the presentation of the insignia all the officials of the State came in order, touched their heads three times on the ground, and each with a great flourish presented a scarf, while a servant banged on the ground great rolls of cloth and silk, the skins of tigers, leopards, and other animals, money and other offerings to His Highness. We were struck here by the extreme youth of the highest officials of the state. After the ceremony we witnessed a dance by masked lamas and were entertained at lunch. Meanwhile the whole population of the valley were fed.

We left Bumtang on August 31, genuinely sorry to say good-bye to our new friends. The Maharaja met us in a tent about 6 miles down from the road, and we had lunch together before parting. We exchanged scarves, which we waved as we called to each other in the Bhutanese

way until out of sight and hearing. Other members of his family travelled two or three days with us.

From Bumtang onwards we were on comparatively unexplored ground. One of the secret-service explorers—later a leading landlord of Sikkim, whose death occurred this year—travelled this road in the 'eighties. When he reached Tibet he was suspected and imprisoned, but escaped and travelled about 50 miles across country to get away from his pursuers. His prismatic compass traverse proved relatively remarkably accurate when compared with Captain Meade's work. Both the Tibetans and Bhutanese appear to have quite got over their objection to surveying, provided they are given copies of the maps.

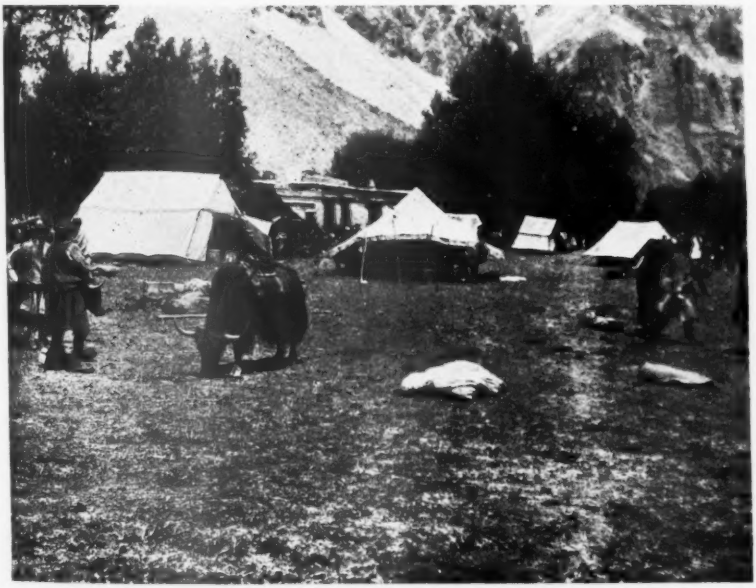
We considered the Bhutanese to be very great artists, especially in metalwork. They make delightful boxes of worked silver for their pan and betel nut, which the whole population chew incessantly. We also noticed beautiful metalwork in their temples. They make very gay saddle cloths of bright colours in *appliqué* work. Their silk-weaving is also extremely effective. The cattle of Bhutan are of enormous size and have a very distinct strain of the huge wild *mithan* of the plains of India. The most remarkable animal is the Bhutanese mule. These animals are imported from China, and they evidently get the pick of the market there—huge, absolutely sure-footed animals. It is the custom for a man to lead the mule and to talk to him all the time. He says such things as " be careful," " slowly," and " look out," etc.

We were disappointed in the game seen in Bhutan. Our bag included bear, bharal, gooral, barking deer, pheasants of various kinds, and quail. Takin are found in one valley, and His Highness presented us with two, of which one died in England and one is at present in the Zoo. Captain Meade once saw sambhar. We also caught a young bear, which we took with us to Tibet and sent to Lhasa as a present to the Dalai Lama.

From Bumtang our road led up a very steep valley, the river being for its size of extraordinary rapidity. After three days' marching we passed the level of fuel, and two days more brought us to the foot of the Mönlakarchung pass, where we camped by a lake at a height of 15,500 feet. From here on August 7 we had a long march, riding on yaks over the pass. We had to cross a large stretch of glacier ice on each side of the pass, while on the summit (17,400 feet above sea-level) the ice was covered in snow in which were deep crevasses which had swallowed up four yaks the day before we crossed. We were lucky to have a fine day for the pass. Bad weather would have made it dangerous. On the pass we parted with Kumar Tobgye Dorji, who had made all arrangements for our journey—no small matter for such a large party—and who was always cheerful under the most worrying difficulties.

Our object was to travel from the Mönlakarchung to the south-east corner of the Yamdrok Tso and thence along the lake, the southern shore of which had never been surveyed. After leaving the pass we were

TALUNG DZONG



CAMP AT TOWA LHOBRAK VALLEY, TIBET

WANGDÖ POTRANG, BHUTAN

CHORTEN IN BHUTAN

met by the local Tibetan official, the Dzongpen of Towa, who accompanied us for several days while we were in his district. We travelled for two days down the Konang Chu Valley, with precipitous sides above which were grass slopes running up to permanent snows.

Our second march brought us to a holy temple called Tsegutok —"Tse of nine storeys." There is a tower nine storeys high built by a holy man, Mila Repa, many years ago. He was greatly interfered with by demons, but in the end was successful. It is an act of great merit to walk round the narrow platform at the top of the tower, on which chains are tied for safety; but it required a better head for heights than we possessed. Of one holy image in the monastery the fingers were tied loosely to the hands by strings bearing a seal, and we were told that in the time of the fifth Dalai Lama (about 1700) this image had spoken, but the effort had been so great that the fingers fell off one hand.

From Tsegutok we made our way to another high pass, the Drum La (16,660 feet), which was luckily clear of snow. On the south side of the pass a series of three lakes flowed one into the other from a small pond below a glacier on Kulakangri, a snow peak 24,784 feet in height. We had some fine views of this group through mist and clouds. On August 11 we reached Towa Dzong in the district of Lhobrak, and were very glad of two days' rest at the comparatively low altitude of 12,500 feet, in a delightful camp, pitched on turf under willow trees with Alpine flowers, including ground orchids, underfoot. At this camp a small herd of bharal came down to the river-bank within 200 yards of our tents, and we spent an interesting hour watching them. The valley was of the typical dry Tibetan type, with irrigated cultivation and poplar and willow trees, and was a great contrast to the thick forests of conifer at similar elevations in Bhutan and Sikkim.

Here in this secluded place the Tibetans keep prisoners whom they wish out of the way. They showed us one dungeon 50 feet deep in which prisoners are kept after being let down with a rope. The actual dungeon was within a few feet of the road, and for years, through the solid rock, the poor creatures in the dark must have heard every passer-by. In a garden the Tibetans had a prisoner, a Chinese General Peng, whom they had captured some years before. He had bombastically told the Tibetans he was advancing on Lhasa, and that they could either fight or clear out: and he had ended in being captured. We wished to see if we could do anything for him, but he refused to see people we sent to him.

The stream at Towa joins that which we had left at Tse a few days before, and the combined streams flow into Bhutan as the Kuru Chu, and eventually reach India in the waters of the Manas. The gorges are so terrible that it is easier to cross the 16,000-feet Drum La than to take the more level way followed by the waters.

We left Towa on August 14 and, crossing a 16,000-feet pass, the

Uyu La, we left the basin of the streams which break through the Himalayas and flow direct to India. We were now in a country between 14,000 and 15,000 feet in elevation in which the water drains into several large lakes. The people are nomads and are quite different from those whom we had left in the Lhobrak Valley. The men braid their hair into many strings, which they gather together in a bunch and allow to hang as a kind of tassel on the right side of the head. In this country we saw numbers of gazelle, kyang (wild donkeys), and hares, and geese on the shores of lakes. All the game was very tame, and we only took sufficient for our own food. On August 17 we reached the shore of the Yamdrok Tso, and enjoyed some lovely lake scenery with its fjords dotted with islands and surrounded by bare hills, the tops of which were dusted with fresh snow. We travelled for three days along the southern shore of the lake ; but were obliged to leave it several times owing to high hills ; and once we actually returned to the Padzo Tso, a lake at which we had camped some days previously, but Captain Meade succeeded in mapping the whole of the southern shore of the Yamdrok Tso.

We spent August 20 and 21 at Talung, at the south-west corner of the lake. Here a famous fair is held once a year, for which we were in time. Traders of several nationalities were there—Nepalese and Ladakis from Lhasa, and people from various parts of Tibet. The usual rubbish was for sale in the bazaar, but the fair is mostly famous for the sale of live stock, and in this we were disappointed. Perhaps we were ignorant of the points of a yak ; but the other animals were inferior in quality and superior in price. One trader brought us a quantity of Russian paper money which he wished us to help him to change.

The new telegraph line had just been made to Lhasa, and we were able to send a man from here to Nangartse to telephone to Gyangtse about arrangements for our journey, and to Lhasa to say how we were getting on ; and our messenger returned with the replies in the evening. No doubt from here our easiest way would have been to have gone to Nagartse, and to have returned by the main Lhasa–Gyangtse road, which had been used by Sir Francis Younghusband's mission in 1904. But our object was to get as much new country surveyed as possible, and so we travelled by an unknown route south of the high snows round the Karo La.

Two days' march from Talung, after crossing the Tug La, a pass 16,750 feet high, in rain and sleet, we reached the valley of a large lake, the Pomo Tso, which is no less than 16,000 feet above sea-level. South of the lake we could see the snow range which forms the Tibet–Bhutan frontier. Mr. White in 1906 had travelled between these snows and the southern shore of the lake. Leaving this lake we climbed to the Dap La, over 17,000 feet high, and here we left the region of the lakes and entered that of streams which, flowing *viâ* Gyangtse and Shigatse, reach the

Tsangpo and thence India. On this pass Gyaltsen Kazi, who had accompanied the Mount Everest Expedition in 1921, collected some fossils which Sir Henry Hayden identified as Jurassic ammonites. The next night we woke to find our tents covered with snow (at 15,150 feet, on August 24). In spite of this we had no frost, and on our coldest nights at the highest altitudes at which we camped, we registered temperatures of about 35° taken in the open.

We now soon entered the Nelung Valley, which had been surveyed by Colonel Ryder in 1904, and our journey to Gyangtse, which we reached on August 27, calls for no notice. From Gyangtse we travelled to Gangtok. On our journey of over 600 miles Captain Meade surveyed about 6000 miles of new country, and revised a much larger area which had only been done very roughly.

Except for some mountain sickness on the Mönlakarchung, the health of the party, which included Lady Cozens-Hardy and my wife, was excellent. Dr. Dyer, who accompanied us, was of the greatest value in making friends with the people, who have the highest opinion of Western medicine, and there is no doubt that in places where one is unknown a doctor adds greatly to the popularity of the party with the inhabitants.

Appendix.

NOTE ON BHUTAN AND SOUTH TIBET SURVEYS, 1922

Captain H. R. C. Meade, I.A., Survey of India

A Survey of India detachment consisting of one British officer, one Indian officer, with Serpa and Gurkha khalasis, accompanied the Political Officer in Sikkim.

An area of 9493 square miles (6589 original survey and 2904 revision) was mapped on the ¼-inch scale, the work being based generally on triangulation carried out during the journey.

Triangulation.—A 6-inch micrometer theodolite was used, reading to 1 second. The rate of march (averaging over 8 miles a day) and the monsoon prevented both ordinary triangulation and an astronomical latitude and azimuth traverse independent of previous triangulation.

The theodolite work consists of 14 hill-station fixings, 12 astronomical azimuths, 6 latitudes, and 32 intersected points.

Mapping.—Like the triangulation, the mapping was affected by the conditions. The whole of the Mo Chu basin in north Bhutan is still unsurveyed, though the prominent snow peaks (two over 23,000 feet) were fixed, and the map between Bumtang, where touch was lost with the Assam Triangulation Series, and Lhunbushö (on the Yamdrok Tso), where the 1904–5 Tibet series could be used, is more or less in the air, and adjusted by astronomical work.

The mapping around the main route through Bhutan is however accurate plane-tabling, and the lake district of Southern Tibet was mapped by photo-survey.

The northern and southern Kulakangri (both nearly 25,000 feet high) and adjacent groups were also fixed.

Of the total output, 5345 square miles consist of accurate plane-tabling and photo-survey, and 4148 square miles of reconnaissance.

SIMON VAN DER STEL'S EXPEDITION TO NAMAQUALAND, 1685

Prof. G. Waterhouse, Trinity College, Dublin

THE Library of Trinity College, Dublin, contains a manuscript (No. 984; L. 2. 13) the importance of which has hitherto escaped attention, although Abbott * gives the following brief description in his catalogue:

984 fol. chart., s. xvii.
Dagh Register Gehouden op de Voiagie gedaen naer der Amacqua Land . . . van den E. Heer Symon van der Stil (*sic*) Commander (*sic*) van Caap de Goede Hoop (an. 1685). With numerous well-executed coloured drawings of animals and plants.
(From the Fagel Library.)

This Journal is one of the manuscripts of the Fagel Library, acquired by purchase in London in 1802. The collection of over 20,000 items belonged to Hendrik Fagel,† Secretary (Griffier) to the States General and Pensionary of Holland, and was removed by him to England, apparently in 1794, when Holland was invaded by the French. In 1802 he made arrangements with Mr. Christie for an auction, and a catalogue was prepared by Samuel Paterson,‡ a copy of which is preserved in the Library of Trinity College. The Preface to the Catalogue begins thus:

"It were superfluous to say more of the following collection, than what is already expressed in the Title-page, save that it is ONE GENUINE LIBRARY; which has been accumulating in the FAMILY OF FAGEL, a name of the first Respectability, and which has born, in Succession, the highest Civil offices in the UNITED STATES of the NETHERLANDS upwards of *One Hundred and Twenty Years*."

The volume appears on p. 177 of the Catalogue as No. 4001:

Journal of a Voyage to the Cape of Good Hope, *Anno*, 1685, by de Heer Symon vander Stil (*sic*), Governor of the Colony, MS. *in Dutch, with* 72 *neat*

* T. K. Abbott: *Catalogue of the MSS. in the Library of Trinity College, Dublin*, 1900.

† Born in Amsterdam, 1765; died at The Hague, 1838. He was the sixth and last of his family to hold the important office of *Griffier der Staten-Generaal*, having succeeded his grandfather, Hendrik, in 1790. He was sent as Envoy Extraordinary to England in 1788 and again in October 1794. When the Dutch Republic surrendered to the French in February 1795, Fagel remained an exile in England, and his property in Holland was confiscated by order of the revolutionary government. After a period of residence in Hamburg and in Switzerland he returned to England in 1798 and was allowed a pension by the English Government. In 1813, after the defeat of Napoleon at Leipzig, he returned to the Hague in the suite of the Prince of Orange, and was then appointed Ambassador to England, holding the post until 1824. He became subsequently Minister of State at The Hague. A full account of the chief members of the Fagel family is contained in the *Nieuw Nederlandsch Biografisch Woordenboek* (Sijthoff, Leiden, 1914), vol. 3, pp. 382–394.

‡ Bookseller and auctioneer (1728–1802). See *Dictionary of National Biography*.

FIG. 1

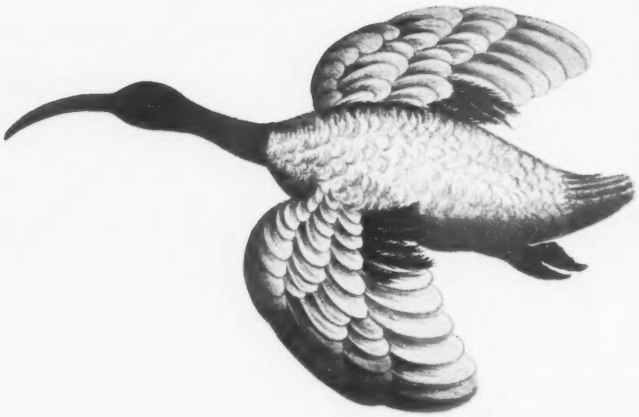


FIG. 2

FIG. 3

drawings, in their proper Colours, of various *Animals, Birds, Reptiles, Insects*, and *Plants*, indigenous to that country, with their Descriptions, *in Dutch*, fol.

The auction, advertised to take place on 1 March 1802 and the twenty-nine following days, does not appear to have been held, as Fagel accepted an offer of £8000 sterling from the Governors of the Schools founded by Erasmus Smith, who purchased the Library in order to present it to Trinity College. The Governors were aware of the opportunity and had come to this decision as early as May 1798, but the rebellion in Ireland intervened, and nothing further was done until 1802. The prime mover in the acquisition of the collection was the Right Honourable John Foster, last Speaker of the Irish House of Commons and subsequently member for County Louth in the united Parliament. The transaction was completed on behalf of the purchasers by Dr. Thomas Elrington, afterwards Provost (1811–20). Fagel's receipt and the Bill of Lading for the cargo are still exhibited in the Library.

The Trinity MS. of Van der Stel's Journal is not the only text, though it may possibly be the only surviving manuscript. Another version was published by François Valentijn * in 1726, in his *Beschryvinge van de Kaap de Goede Hoop, met de Zaaken daar toe behoorende* (*Oud en Nieuw Oost-Indien*, Vyfde Deel, Thiende Boek, pp. 54 ff.) and was stated by him to have been supplied by Willem Adriaan van der Stel, who succeeded his father in 1699 as Governor of the Cape of Good Hope. Valentijn's text differs notably from the Trinity MS. It is longer, recording all changes of course in detail, whereas the Trinity MS. is condensed and gives the impression of a carefully edited official report.

Valentijn visited the Cape in 1685, 1695, 1705, and 1714 on his way to and from the East, but it is uncertain on which, if any, of these occasions he obtained his text. The first date may be ruled out, as the expedition did not return until January 1686. The year 1714 seems equally impossible, as Willem Adriaan van der Stel was recalled to Holland in 1708, and Simon died in 1712. Valentijn himself was returning in disgrace, having been dismissed from the Company's service the previous year in consequence of his refusal to proceed to an unhealthy station. In 1695 Willem Adriaan was still in Holland, so that 1705 is the only year in which he and Valentijn could have met at the Cape. But in that year Simon van der Stel was still alive, and it seems improbable that if Valentijn obtained his MS. then he would have omitted to consult Simon and to record the fact in his book. It may reasonably be conjectured, therefore, that Valentijn obtained his text in Holland either

* François Valentijn was born at Dordrecht in 1666 and died at The Hague in 1727. A clergyman by profession, he was employed in the East from 1685 to 1694, and again from 1705 to 1713, when he was dismissed from the East India Company's service in consequence of a dispute with his superiors. He returned to Dordrecht in 1714, where he compiled his great work *Oud en Nieuw Oost-Indien*, 1724–6, of which the above-mentioned *Beschryvinge* . . . forms part.

between 1695 (return from his first voyage) and 1699 (departure of Willem Adriaan for the Cape)—in which case it must have been sent to the latter by his father—or after 1714, when both Willem Adriaan and Valentijn had been recalled to Holland. When Willem Adriaan was deprived of his office he may have included among his own papers his father's first official draft (not the original notes) of the Journal.* As will presently be shown, a carefully edited official report was despatched to Holland by Simon before 1691, probably in 1686, as soon as possible after the return of the expedition. As far as can be discovered, Willem Adriaan had no first-hand knowledge of the details of the expedition, and it is clear from the occasional gaps in Valentijn's text that the latter was not in a position to obtain authoritative corrections.

Valentijn introduces the Journal with a few words on the beginnings of exploration in South Africa, and proceeds: "Memorable and no less dangerous was the expedition to the north made by old Simon van der Stel in the year 1685, as far as the Tropic, a distance of fully 200 miles [*Dutch*]. We give the account here as it was supplied to us by the Honourable Willem Adriaan van der Stel." †

In the very year in which Trinity College acquired the Fagel Library, Great Britain undertook, by the Peace of Amiens, 1 April 1802, to restore the Cape to Holland, and Jacob Abraham Uitenhage de Mist was sent out as Commissaris-generaal to take over the administration. In his 'Report on the Cape in 1802,' De Mist made a very important reference to Van der Stel's Journal: "The original, accompanied by 72 drawings, had already at the end of the seventeenth century been taken out of the Cape Books and disappeared." He refers to the Cape Books in the Archives of the Dutch East India Company in Holland. ‡

The next writer of importance on this subject is Donald Moodie, who published in his 'Record,' 1838, an abridged translation of the Journal, quoting Valentijn as his source.

The late Dr. G. McCall Theal likewise gives a summary in his *History of South Africa under the Administration of the Dutch East India Company*. § A serious difficulty now arises. Theal was familiar with the work of Valentijn and Moodie, for he quotes both in his Bibliography. At the same time he gives the impression that he had access to a manuscript, for he states definitely in the Preface that a copy of Van der Stel's Journal is preserved in the Cape Archives. The present

* His dismissal was ordered in 1706, but he did not hear of it until April 1707, and managed to delay his departure until April 1708.

† "Aanmerkenswaardig, en niet min gevaarlyk, is de togt geweest die de oude Heer *Simon van der Stel* in 't jaar 1685 na 't N., tot aan den *Tropicus*, en wel ruim 200 mylen verre, gedaan heeft. Wy geven de zelve hier vervolgens, zoo als ons die door den Ed. Heer *Willem Adriaan van der Stel* is ter hand gestelt."

‡ I am indebted to Mr. C. Graham Botha for this reference.

§ *History of South Africa under the Administration of the Dutch East India Company*, 1652–1795. London, 1897 (2nd edition).

FIG. 4

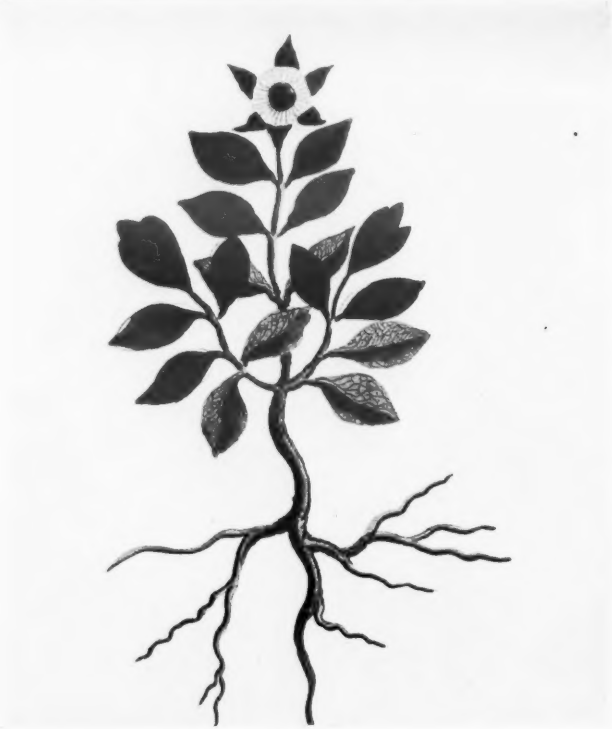


FIG. 5

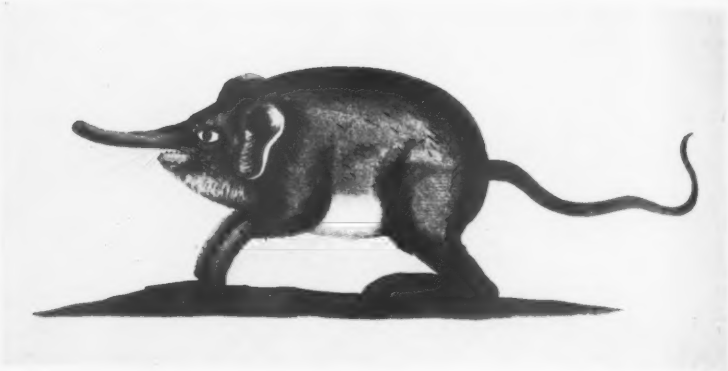


FIG. 6

FIG. 7

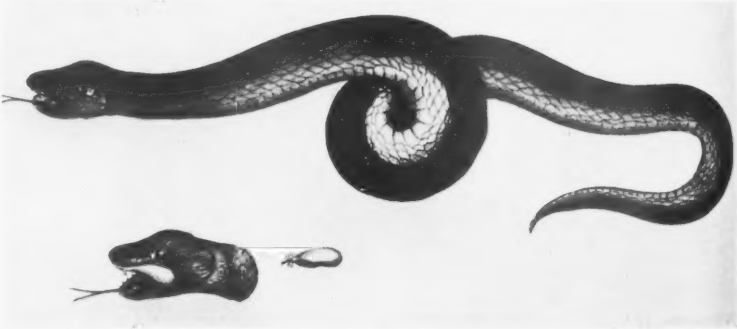


FIG. 8

Chief Archivist, Mr. C. Graham Botha, assures me however that there is no such MS. in the Cape Archives, and that Theal evidently made a mistake in including it in his list. A number of documents were copied from the Hague Archives for the Cape Archives about forty years ago, including accounts of various journeys inland, but Van der Stel's is not among them. Moreover, Moodie would undoubtedly have used such a manuscript had it been in the Archives, whereas he used Valentijn's text. It would therefore appear that Theal also drew on Valentijn for his summary and was mistaken in his reference to a manuscript. At the same time, it is difficult to reconcile Theal's first paragraph (printed below) with Valentijn's text.

Valentijn's text was reprinted in 1916 by Dr. E. C. Godée Molsbergen in *Werken uitgegeven door de Linschoten-Vereeniging, XI. Reizen in Zuid Afrika in de hollandse tijd* with important notes. Dr. Molsbergen observes that he is compelled to follow Valentijn rather than the official records *because the Journal is missing from the Colonial Archives at The Hague:*

"Kol. Arch. No. 3999, f. 671–727 once included *Daghregister der voiagie na der Amacquas land onder 't beleyd van Commandeur van der Stel gedaan beginnende* 25 *Augusti* 1685 *en eyndigende* 26 *January* 1686. F. 728–870 consisted of *Twee en seventigh diverse tekeningen tot hetselve journaal behoorende.* In the index both numbers are joined by a bracket, against which appears the melancholy note: *Removed about* 1691 *or* 1692 *but unknown to whom delivered.* Our debt to Valentijn in this matter is therefore very great. Nor does the account of the journey appear in the *Brieven en Papieren van de Caap ontfangen met de Retourvloot d' A°* 1686 *van Kamer Zeeland,* Kol. Arch. No. 7568 and 7569 (received in 1687)."

Dr. Molsbergen is able, however, to reproduce an elaborate chart in colours, which is presumably the one copied by Theal from the records at The Hague and reproduced in a simplified form in his *History*. It is extremely difficult to follow the course of the expedition on either.

Three important questions now present themselves for solution, viz.:

1. What became of the Commander's original notes, made from day to day on the actual journey?
2. Where is the MS. used by Valentijn?
3. What is the Trinity College MS.?

The first two still await solution; the last can now be answered. The Trinity College MS. 984 is the *identical section* removed about 1691 or 1692 from the Archives of the Dutch East India Company. How it came into the possession of the Fagel family cannot at present be explained. The MS. is a folio volume bound in speckled calf. The back has seven panels or compartments and the centre panel once contained the official number of the volume. This was at some time deliberately chipped away, and it is now possible to distinguish only

the first half of a capital M and perhaps part of a small t. Below these letters are the lower half of a 5 and a complete 7, so that the description may have been $\frac{\text{Msct.}}{57}$ If the volume was illicitly removed, as these erasures suggest, and if it was removed about 1691 or 1692, then the binding belongs to the period 1686–92. The paper is now $12\frac{3}{8}'' \times 8''$, but it was trimmed by the binder. The text is preceded by three covering leaves, of which the first two are thin paper with wire-bars at 20 mm. distance. The first has a MS. note "Fagel Catal. No. 4001," but no watermark. The second is the same paper with a watermark consisting of a crooked cross above the letters I H S. These thin leaves, with two more at the end of the volume, are no doubt additions made in the binding of the MS. The third blank leaf is of stout paper with the watermark C D G in block capitals and wire-bars at 25 mm. distance. It is the only leaf of its kind.

The text folios *are numbered from* 671 *to* 870, of which 671–727 contain the Diary and 728–870 the illustrations and explanatory notes. The first section covers both sides of the paper and is in one hand throughout. The second section is in a different hand, and yet another hand—presumably that of a clerk in the East India Company's Record Office—numbered the folios. The text is written on stout paper with wire bars at 25 mm. distance. The watermark is the arms of Amsterdam with the letters H G in a cursive hand below the shield. The countermark consists of the letters P B in block capitals. An unnumbered blank folio appears after f. 672. It is of the same quality as the rest, but the watermark is the Dutch Lion in a double circle, with the letters A I in a cursive hand below.*

The second section 728–870 † shows a mixture of two papers, though of the same stout quality. The watermark is either the Arms of Amsterdam with the countermark P B as before, or the Dutch Lion in a double circle with the countermark D I in block capitals; but in this case a faint monogram (CAW ?) appears below the circle instead of the letters A I. The paper marked with the arms of Amsterdam and the letters P B predominates.

Comparison of the Trinity MS. (T) with Valentijn's text (V).

The Trinity MS. begins with folio 671, and the following is a translation of the complete entry for the first day:

"Journal kept on the expedition to the land of the Amacquas under the command of the Honourable Symon van der Stel, Commander of the Cape of Good Hope, etc.

* I am indebted to Mr. Heawood, the Librarian of the Royal Geographical Society, for the identification of these watermarks (see his note following this paper).

† Folio 745, evidently a drawing of a lizard, is missing.

"Anno 1685

"August

"Saturday the 25th. In the morning at ten o'clock, in the name of the Lord, Amen, we marched out of Fort Good Hope with our baggage, our strength being 57 white men, as may be seen from the attached roll, and one Dain Mangale, or prince of Maccasser, with his servant, and also three black servants of the Honourable Commander. Our train consisted of one carriage with six horses, eight mules, fourteen riding horses, two field pieces, eight carts, seven waggons, one loaded with a boat, two hundred and eighty-nine draught or pack oxen, with an additional convoy in our service of six burghers with their own waggons, each yoked with eight oxen, who are to take leave of us at Elephants' River. We set a course 5° 3′ east by north and after marching 1½ miles * (*i.e. about four English miles*) we camped at a place called Hooge Kraal, where the Honourable Commander joined us at four in the afternoon, accompanied by Seigneur Andries de Man, the *secunda persona*, Captain Hieronimus Cruse, besides various members of the Council and others of lower rank. The party was paraded, fully armed, and welcomed them with the firing of three salvos. Our latitude was 34° 20′."

Valentijn's text begins:

"Journal and description of the expedition to Amacqualand under the command of the Honourable Simon van der Stel, Commander of Cabo de Boa Esperanca.

"Saturday, being the 25th of August 1685. In the morning at ten o'clock in the name of the Lord, Amen, we marched out of Fort Good Hope with our baggage, our strength, in addition to the Honourable Commander, being 56 white men, besides Dain Bengale and his servant, both of them Maccassars, together with 3 slaves of the Honourable Commander. Our train consisted of 1 carriage with 6 horses, 8 mules, riding horses †, 2 field pieces, 8 carts, 7 waggons, 1 boat, 289 draught or pack oxen together with 6 burghers and their waggons, each yoked with 8 oxen, who are to convoy us as far as Elephants' River. We set a course 5° 3′ east by north, and after marching 1½ miles we camped in a place called Hooge Kraal and found ourselves in latitude 34° 9′. We took a bearing 5 east by north from the Lion's Head, the weather being rainy. The Honourable Commander joined us here about four o'clock in the afternoon, accompanied by Seigneur Andries de Man, the *secunda persona*, Jeronymus Cruse, Captain, and various other members of the Council, and others of lower rank. The party was paraded fully armed and welcomed them with firing of three salvos."

The corresponding paragraph in Theal's *History* begins:

"The train as now completed consisted of fifteen waggons, each drawn by eight oxen, eight carts, and one coach. Of the waggons, eight belonged to burghers, and it was intended to take them no further than Elephant River. There were two hundred spare oxen, most of them trained to carry burdens on their backs, thirteen horses, and eight mules. There was a boat

* *Mijl* is approximately an hour's walk, say 3–4 English miles.

† Number omitted.

for the purpose of crossing the Berg and Elephant rivers, and there were two small cannons to impress the natives with proper respect for the power of the Europeans. The travelling party consisted of Commander Van der Stel, with three slaves as personal attendants, fifty-six Europeans of various callings, including soldiers, a Macassar prisoner of state, named Dain Bengale or Manalle, with a slave as his attendant, forty-six drivers and leaders, mostly of mixed blood, and a number of Hottentots to serve as interpreters."

The only important difference here between T and V is that T mentions a list of the members of the expedition which, if it was ever compiled, has unfortunately gone astray. Perhaps the blank folio after 672 was intended for something of the kind but never filled in. The paper is, however, of a different manufacture.

One of the most important variations between the two texts is the inclusion in V of all changes of course, whereas T condenses all these details, *e.g.*:

T. "Monday the 27th do [*August*]. In the morning about 8.30 we took our leave of the above mentioned friends and marched at first with many detours through, along, and over various high mountains (which are called the Tiger Mountains) until we came to a plain stretching east by north, abutting on another mountain, and after we had marched round the latter we found ourselves in a plain called "the round woods," situated at the end of the aforesaid Tiger Mountains."

V. "*Monday the 27th ditto.* In the morning about 8.30 we took our leave of the above-mentioned friends and had this day various courses, on account of the great mountains, over and along which we had to march; thus first N.N.E. ½ mile, thence ⅓ mile E. by N. thence ½ mile E.N.E., thence ¼ mile E. by N., thence ¼ mile E.N.E., thence N. by E. ¼ mile, whereupon we reached a plain which extended for ⅗ mile E. by N., this plain abutting on a mountain round which we marched N.E. ½ mile, where we found another plain, which is called Round Wood. . . ."

The following is an abridged table of the minor variants, showing a marked and frequent disagreement in figures of latitude and longitude, etc. In the case of proper names I have also quoted Theal, who agrees with V rather than with T.

1685.	T.	V.	Theal.
25.8.	Caep de Goede Hoop	Cabo de Boa Esperanca	
	Dain Mangale	Dain Bengale	Dain Bengale or Manalle
	Maccasser	zynde Macassaren	
	veerthien Ry paerden	(number omitted)	thirteen horses
	289 ossen	289 ossen	200 spare oxen
	Eliphants Rivier	Olifants-rivier	
	Hieronymus Cruse	Jeronymus Cruse	Hieronymus Cruse
	(not mentioned)	Leeuwenkop	
	breete van 34° 20′	breedte van 34° 9′	
26.8.	Tafel Bhaey	Tafelberg	
	33° 58′	33° 55′	

1685.	T.	V.	Theal.
	38° 17′	38° 2′	
27.8.	de ronde bosjes	het Ronde Boschje	
	Schagger	Schagher	Schacher
	Kuyper	Kuiper	Kuiper
	3½ myl	3¼ myl	
28.8.	Capt. Dogges Meester	(name omitted)	
	Mosselbancx heuvelen	Mosselbanks heuvelen	
	33° 44′	33° 29′	
	4⅓ myl	3⅓ myl	
	38° 41′	38° 33′	
29.8.	Casteel de goede Hoop	Kasteel der Goede Hoop	
	15¾ myl	12¾ mylen	
30.8.	Ribeecx Casteel	Riebeeks-kasteel	
	Ribeecq	van Riebeek	
	33° 2′	30° 2′	
31.8.	sonquas deurdrift	Sonquas Doordrift	
	St. Helena bhaey	St. Heleens baay	
	32° 58′	38° 57½′	
1.9.	huysjes	Huiskens	
	(not mentioned)	soort van visch, den barm in Holland zeer gelykende . . .	
2.9.	(not mentioned)	2 Kraalen van Capitein Goereman	Two kraals of Cochoquas
4.9.	Assagaey	hazagaai	
	32° 58′	32° 48′	
	38° 57′	38° 14′	
5.9.	(not mentioned)	Trompetters Doordrift	
	Rhenoster	Rhinocer	
	Gouverneur Goske	Heer Gotske	
	3 mylen	4 mylen	
	32° 48′	32° 32′	
6.9.	Rhenosters krael	Rhinocersrug	Rhenoster Rug
	Europese Leyen	opregte Vaterlandze Leyen	
	(not mentioned)	Disputes of Sonquas and Amaquas.	
8.9.	Canarie bergh	Kanariberg	
	1½½ mylen	1½ myl	
	32° 38′	32° 18′	
9.9.	Oedessons Clooff	Olofsonskloof	
	St. Martins	St. Martyns	
	5½	5–50	
	3¾ myl	4¼ mylen	
10.9.	1¼ myl	1¾ myl	
	32° 14′	31° 55′	
	32° 16′	31° 54′	
	38° 46′	38° 5′	
11.9.	31° 43′	31° 41′	
	38° 35½′	38° 45½′	
12.9.	Eliphants Jacht	Olifants-jagt	
	32° 3′	31° 45′	

1685.	T.	V.	Theale.
13.9.	31° 59′	31° 39′	
	38° 25′	38° 30′	
14.9.	Bergh Fonteyn	Klipfontein	
	3 mylen	4¼ mylen	
	31° 46′	31° 23′	
4.10.	Captn. Noncé	Capitein Nonce	
9.10.	Oedesson	Oedeson	
10.11.	Otwa	Atwa	
25.12.	Luytenant Bergh	Vaandrig Berg	Ensign Bergh
1686.			
18.1.	Goenjeman	Goenjema	

Although V gives as a rule more detail than T, the account of the Orange river is longer in T than in V :

T. "Friday the 23rd do. [*November*]. . . . On the sea-shore we found large trees which had been washed up there, which led us to believe that there must be a great river hereabouts, with large trees on its banks, whence these trees came, especially as the Hottentots had told us that very large trees are found in the river they call Eyn, which certainly cannot be far from here, as we had found in the Amacqua kraals several of the Hottentots called Kamesons, who live by the aforesaid river. We questioned them about it at the time but they were unwilling to give us any information whatever. . . .

"Tuesday the 11th do [*December*]. . . . In the meantime the Honourable Commander interrogated the above-mentioned Sonqua who then said that he was not a Sonqua but one of the tribe called Kamesons who inhabit the bank of a broad and powerful river, which he said was called *Eyn*. It rises in the interior amongst very high and steep mountains, from which the water flows with great violence. Beside this river lies a great lake on the shores of which a tribe of Hottentots lives all the year round. This river should be reached from here in four or five days. All this information was given by the aforesaid Kameson, for which reason the Honourable Commander resolved to take him back with him to the Cape, so as to be able to make use of him as opportunity offered, seeing that he was familiar with the whole country hereabouts. . . ."

V. "Friday the 23rd do. [*November*]. . . . On the sea-shore we found very large trees which had been washed up there, which made us conclude that there must be a great river hereabouts, with large trees on its banks, whence these trees came, especially as the Hottentots had told us that very large trees are found in the river they call *Eyn*, which we call *Vigiti Magni*, and which certainly cannot be far from here, as we had found in the Amacqua kraals several of the Hottentots called Kamesons, who live by this same river. We questioned them about it then but they were unwilling to give us any information whatever. . . .

"Tuesday the 11th ditto [*December*]. . . . In the meantime the Honourable Commander interrogated the above-mentioned Sonqua, who then said that he was not a Sonqua but one of the tribe called Kamezon, and after having conversed with him for a long time the Honourable Commander resolved to take him back with him to the Cape, seeing that he was familiar with the whole country hereabouts. . . ."

There is a very striking discrepancy between T and V in the entries for Tuesday, 18 December 1685. On this day the expedition came into conflict with the natives, shots were fired, and a native was wounded and captured. This incident is suppressed in T, which strengthens my belief that T is the official report of the expedition, the Commander having decided, on reflection, to leave his superiors in ignorance of this unfortunate occurrence.

T. "Tuesday the 18th do. [*December*]. We remained here in camp and in the meantime the Honourable Commander sent out a sergeant with a few men to search for the Doornbosch River and at the same time to see if there were any means of proceeding in that direction. They came back about nine o'clock in the evening and reported that they had found the aforesaid river. . . ."

V. "Tuesday the 18th ditto. We remained here in camp and in the meantime the Honourable Commander sent out a sergeant with a few men to search for the Doornbosch River and at the same time to see what the conditions were there. About mid-day there came to the neighbourhood of our camp two Sonquas who, as they themselves confessed, intended to kill one or two men, if they could have cut them off, and then drive away some cattle, whereupon the Honourable Commander sent out a party in their direction with orders to capture them without violence, if possible, but in case of resistance to treat them as enemies are usually treated. When our party approached them, they saw eight of them and five of these Sonquas took flight and escaped, and when the other three saw that they were surrounded, two of them voluntarily surrendered. The third offered resistance, was fired on and wounded in the legs. The prisoners were then brought before the Honourable Commander and after having been interrogated for a long time they confessed that they and all the other Sonquas had been sent hither by the Amacquas to do us as much harm as they could. They were then placed under arrest, together with the above-mentioned Kameson, and guarded. In the evening about nine o'clock, the Sergeant came back and reported that they had found the aforesaid river. . . . They also brought back two Sonqua women, who were placed under guard along with the other prisoners."

The final entry in the Journal in T is much more elaborate than the bald statement in V:

T. "Saturday the 26th do [*January*]. In the morning, about eight o'clock, the Honourable Commander set out with a small escort from the aforesaid Bommels Hoek for the Cape of Good Hope and ordered the rest of the train to follow about mid-day, and arrived thus about mid-day unexpected at Fort Good Hope, where he was welcomed by various members of the Council and other good friends. The rest of the train arrived there about four in the afternoon, our course and distance being approximately S.W. by S. $5\frac{5}{8}$ miles, all being in the same condition as when we started, for which be given praise and thanks in the highest to Almighty God, who on this great and difficult journey has so mercifully kept us free from all sickness and other hardship in his fatherly protection, and let us pray that henceforth his blessing and loving-kindness may rest on us and all things from now to all eternity Amen."

V. " Saturday the 26th ditto. The Honourable Commander set out with a small escort for the Cape of Good Hope, and ordered the carts and waggons to follow. They arrived there about five o'clock in the afternoon, wherewith this expedition came to an end."

Conclusion.

The conclusion to be drawn from this discussion of the variants is that the Trinity MS., removed from the Archives of the Dutch East India Company in 1691 or 1692, is not the source of Valentijn's edition of 1726. Search must now be made for the MS. supplied to him by Willem Adriaan van der Stel, though even this text cannot be the original Journal kept from day to day, as certain entries in V (*e.g.* December 7, 8, and 9) could not have been made on the days mentioned. They deal entirely with the movements of a reconnoitring party which was despatched on December 7 and did not return until the afternoon of the 10th. The earliest date on which the Commander could have received the sergeant's report was therefore December 10, and if Valentijn's MS. was the original journal, we must assume that for four days the Commander deliberately refrained from recording the doings of the main body.

The Second Part of the Trinity MS.

The second part of T consists of seventy-one * coloured drawings with descriptive text. The handwriting is different from that of Part I. These drawings are so carefully executed as to leave no doubt that they formed part of the official report of the expedition. They are presumably the work of Hendrik Claudius,† a native of Breslau, who had been selected on account of his artistic skill to accompany Bergh's expedition in 1682.

Other sketches associated with Van der Stel's expedition exist. Molsbergen observes (*op. cit.*, p. 144, *note*) that MS. Germ. quarto 238 in the Royal Prussian Library, Berlin, contains fifty-two drawings of plants under the heading " Drawings and descriptions of the plants found by Simon van der Stel, Governor at the Cape of Good Hope, on his great inland journey, 1685." Mr. C. Graham Botha, who examined this MS. in 1921, has kindly sent me a tracing of one of the items—a description of a geranium. The handwriting is quite different from either part of T, and the text does not correspond with any entry in the second part. Moreover, the drawings are in black and white, not colours, and T has only forty-three sketches of plants, not fifty-two.

The matter is further complicated by the existence of a number of drawings, likewise associated with Van der Stel's journey, preserved in

* There ought to be 72, but fol. 745 is missing.

† C. Graham Botha, *Some Early Exploring Expeditions and Travels in South Africa.* A lecture delivered on 31 March 1916, at the quarterly meeting of the Mountain Club.

the South African Museum and the South African Public Library, Cape Town. They were purchased in Europe about fifty years ago.

The following is the sequence of the folios in the Second Part, together with translations of the more interesting items :

728a. Panorama (Fig. 1). MS. indications in two hands.

728b. A.A.A. This is the Copper Mountain discovered by the Honourable Simon van der Stel on October 21st 1685 and explored by him in person for fully ten miles. It consists of one lode and vein throughout, which rises from below ground and ascends to the top of the mountain and is at least eight or nine feet wide but in most parts from eight to twelve yards.* It was observed to be all of one colour, with a covering of verdigris.

H.V.R.† A mountain consisting entirely of copper ore from top to bottom. An excavation was therefore made, at least eighteen feet deep, and large quantities of rich mineral were disclosed.

S.M.† A mountain half of ore, but the interior is believed to be as rich as H.V.R. and to be part of the same lode or vein. An excavation was therefore made, four feet deep, and disclosed very good mineral.

729a. S.V.S.† A mountain with a great level section which cuts through the above-mentioned lode for fully eight to ten yards in depth. It was tested to a depth of two feet and the ore was found to be as good as the preceding.

B.B.B. The lode or vein of copper, which was followed, as aforesaid, for fully ten miles. Its termination is unknown.

C.C.C. A spring or brook with a constant flow of water, both banks overgrown with the same kind of reeds as in the Netherlands.

D.D.D. Aloe trees.

729b. *Blank.*

730a. Panorama.

Note at foot. E.E. A plain, lying about three miles north of the Copper Mountain, in the middle of which was found a flat rock from the pores or holes of which verdigris bubbles, as it were, and oozes.

730b. *Blank.*

731a. *Two natives, man and woman* (Fig. 3).

731b. *Blank.*

732. These Namaquas belong to the Hottentot race and live in 29° 31′ south latitude, but they have no fixed abode. According to the season of the year, they go into the mountains and then back to the valleys and the shore, wherever they find the best pasture. When they have consumed the forage in any place, they move on in search of other spots where they can maintain themselves.

* *Van* 2 *à* 3 *Roeden breette.* The *roede* varies locally between 3½ and 4 metres.

† If S.V.S. stands for Simon van der Stel, H.V.R. and S.M. are possibly the initials of other members of the expedition.

The men wear an iron plate on their foreheads. They know how to make these plates and they polish them so smoothly that they shine in the sun, as may be seen from the accompanying sketch. They wear the skins of *dassies*,* jackals and wild cats, just like the Cape Hottentots, but longer, cleaner, and not greased. Before their *pudenda* they wear an ivory plate, and black beads as ornaments round their neck and middle. These beads are of different sizes, but mostly like hazel nuts. They make them very cleverly from a certain gum, which falls into the neighbouring river. They also make round beads from the copper which their mountains produce, and they thread them artistically between the other beads.

In their hand they usually carry the tail of a wild cat stretched on a stick, with which they wipe their faces and particularly their eyes.

Their weapons consist of a poisoned assegai and a quiver with poisoned arrows, for which they get the poison both from snakes and from the mountains. They are lighter in colour and cleaner in body than the Cape Hottentots, of equal stature but clumsy in figure, living more rudely, without laws or religion. Whoever has the most cattle is considered to be the most important man among them, and they seem to fear nothing except thunder and lightning.

732b. They are very mendacious and deceitful. They eat everything that comes their way, down to rats, dogs, cats, caterpillars, locusts, etc. For hares alone they have great distaste and loathing so that they will not partake of any dish containing hare, whether boiled or roasted.

Their drink is mostly fresh milk and butter-milk. They smear their bodies with butter and generally chew a certain herb called *Canna*. They pound it root and stem together between stones and store and preserve it in bags made of sheepskin. In October, when we were approaching the Copper Mountain, everybody was gathering this herb on the surrounding mountains as a supply for the whole year. They use it as the natives of India use *betel* or *areca*. They are of a cheerful disposition and almost every evening in their gatherings they dance to the accompaniment of their flutes, which have a monotonous note, somewhat resembling an organ. They lend their wives freely to one another and the less jealous the husbands, the more lascivious are the women. The latter wear on either side of the head a sharply pointed, oval piece of ivory fastened in their hair; in their ears and round their neck, stomach, and arms they wear red and black beads. Over their shoulders they wear, like the men, the skins of wild animals, mostly jackals. They twist a number of straps round their middles, cut from ox-hide and neatly arranged to cover their *pudenda*.

—— Blank folio (wm. arms of Amsterdam with cursive letters H G below).

From this point in the MS. to the end the odd folios contain the illustrations, the even folios the descriptive text.

733, 734 (Fig. 4).

This sweet and friendly little creature, here drawn from life and in natural

* *Procavia capensis;* variously translated "badger," "cony," and "mountain-rabbit."

size,* lives among rocks and underground, where it preys upon all kinds of grubs. It is very easily tamed and very amusing, as owing to its liveliness in the daytime it cannot remain still and must be doing something or other. It is called *Chara* by the natives. Discovered November 15th.

735, 736. *Rabbit. Caterpillar.*

This kind of wild rabbit, called *Nabosse*, lives near the ore mountains. It has a pleasant and dainty flavour. Discovered October 20th.

This caterpillar is called *Aroube* by the Namaquas and is found in their country. This monster is regarded by them as a delicacy and a dainty dish, for when they have first squeezed out of it all the green ordure, they impale it on a wooden spit and lay it in the embers until it is baked hard and they then consign it with gusto to their eager bellies; but if they desire to eat it boiled, they prepare it as they do the red and green grasshoppers, for after squeezing the grosser ordure out of it, they put it into an earthenware pot, without adding liquid or anything else, and let it stew and boil for half an hour, stirring it all the time in its own green juice, and then, when they take this savoury mess from the fire and out of the pot and dry it, they roll it into balls and eat them with such avidity and enjoyment that the astonishment of the spectators knows no bounds. Discovered December 25th.

737, 738 (Fig. 6).

This curious field-mouse is found on the other side of the Elephant River, where it was seen by us on September 25th. . . .

753, 754 (Fig. 2).

This bird is found in brackish rivers and on the shore, and since it tastes of oil it is not considered fit to eat. Found December 18th.

765, 766 (Fig. 7).

This beautifully crested bird is attractive equally on account of the varied colours of its feathers and because it enlivens the gloomy forests of the Picketberg with its sweet song. Found September 4th.

777, 778 (Fig. 8).

The natives diligently hunt this snake and poison their arrows and assegais with its powerful venom. They first remove the skin from the upper jaw-bone, and disclose beneath it a small oblong bladder, full of little glands. Its opening can be seen near the upper fang and out of it runs a clear white slime or saliva which is the actual venom with which they smear their weapons. They first tie up the aforesaid bladder or *glandula salivalis* near to the tooth with a fine thread, in order to prevent the venom from escaping. Then when the bladder is dry they divide it and smear with it the desired weapons. This snake is found everywhere and is called *Hamachou* by all Hottentots. Found November 8th. . . .

Note by Mr. Heawood.

The watermarks of the papers used in the T.C.D. manuscript, tracings of which have been kindly sent by Prof. Waterhouse, supply a most satisfactory confirmation of the contemporary character of the document, and would have almost sufficed to establish this, apart from the other evidence given by the Professor. As stated in my paper in the May number, the Arms of Amsterdam are to be found in a great many papers of the seventeenth and eighteenth centuries, but the form of the mantling over the shield in the present specimen brings it within a group which seems to have been current chiefly from about

* This and the other natural history illustrations have been reduced to about two-thirds the scale of the original drawings.

1670 to 1700, of which a specimen is to be seen in the illustration No. 164 in the May number. That in the T.C.D. manuscript can be exactly matched from a book printed in London in 1688. The lion of Holland in an oval band (*ibid.*, No. 166) is also a common mark of the same period (my earliest specimen is from 1669), but the only other example I have yet found with the monogram CAW (?) beneath dates from the very year 1686 to which the T.C.D. manuscript is ascribed. The initials of the makers or mill-owners not only confirm this date, but tell us where the paper was made. The details of the Angoulême paper industry given by Briquet ('Les Filigranes,' vol. 4, pp. 704–6), show that in the C D G of the MS. we have the initials of Claud de George, an Angoulême maker who died a little before 1686. The use of his initials (which had come to be regarded as a guarantee of quality) by another maker gave rise to a lawsuit in this very year 1686, the plaintiff being Jacques Salmon, proprietor of the mill which De George had worked, and the defendant Abraham Janssen, whose initials are probably to be traced in the A I under one example of the lion. (Curiously enough, they also occur in the same book, published in 1686, in which the CAW is to be found.) In the countermark D I we have the initials of Dericq Janssen, who is known to have held several mills at Augoulême between 1656 and 1673 (and probably later). The P B with the Amsterdam arms may perhaps stand for Pierre Bernard, another of the Angoulême makers of the time.

Salmon's plea in bringing his suit stated that complaints of unequal quality in paper marked C D G had been made by the *Dutch Merchant* to whom the paper was supplied, and we thus have the required link between the makers and users of the paper of the T.C.D. manuscript.

NOTES ON THE MARCH OF ALEXANDER THE GREAT FROM ECBATANA TO HYRCANIA

A. F. v. Stahl

THE Greek historians and geographers who described in their works the march of Alexander through Persia, Media, and Parthia, generally omitted the native names of towns and places which he passed, substituting Greek names for the most part. If we note only the number of "newly founded" towns called Alexandria, and consider that Alexander, pressing forward, could hardly have had time for the foundation of new towns on his road, we must come to the conclusion that he gave his name to towns already existing, the native names of which remain unknown.

The descriptions of the roads and countries which he traversed are also very deficient and sometimes confusing. In consequence it is more than difficult to reconstruct this march geographically with the desirable accuracy, and up to the present moment many questions in regard to it are still unsolved. This fact induces me, since I have explored a considerable part of Northern and Central Persia, to discuss in the following pages, from a geographical point of view, the famous march of Alexander the Great from Ecbatana to Hyrcania.

In the first place, there is some doubt as to the site of this Ecbatana. It is now generally identified with the modern Hamadan. Sir Henry Rawlinson, however, in a paper published in the *Journal R.G.S.*, vol. 10, 1840, endeavoured to prove that the Ecbatana to which Darius fled, and to which Alexander followed him, occupied the site now known as Takht-i-Suleiman. A brief consideration of the position of Hamadan and Takht-i-Suleiman, and of some of the classical references, will, I think, show that the Ecbatana of Alexander's march is to be identified with Hamadan.

Takht-i-Suleiman.—The ruins of the fort known as Takht-i-Suleiman are situated in the province of Azerbaijan, in the district of Afshar. On the north, west, and east sides the Afshar district is surrounded by high mountain ranges, and only towards the south is the country more open and hilly. The ruins of the fort are in a narrow valley, surrounded on three sides by commanding hills. The circular wall stands on a mound, 15 to 20 feet high. Built of limestone tufa, the walls have a circumference of about 1500 yards.

Inside the wall is a round, very deep lake, of strongly calcareous water. This lake is surrounded by the ruins of a palace of no great age, and a mosque, whereas the western half of the interior is covered by ruins and heaps of broken kiln-burnt bricks, which represent the more ancient quarter. In the centre Sir Henry Rawlinson observed the remains of a fire-temple, and at the western side of the fort, outside the wall, he found traces of an old town. The space between the mound with the ruins and the surrounding steep hills does not exceed 100 to 150 yards. Over the southern space winds a mound 10 feet high, along the line of an old watercourse used for driving a mill.

To the west of the ruins, on somewhat more elevated ground, there rises the high conical basin of an ancient, now waterless, fountain named Zindani-Suleiman, and to the south-west of this basin, on the same elevated ground, a line of mineral springs stretches. To the north is the broad, slightly hilly slope of the high mountain range, whence several streams flow south to the north-west arm of the Saruk river, which runs past the Zindani-Suleiman. On this mountain slope are situated the villages Gangabad (village of treasures), Chiragh Tepe (hill of fire), and Zarshuran (goldwashers). In the stream which passes the last-named village the sand contains gold-dust, grains of cinnabar, and magnetic iron sand, and on the top of the mountains is a mine of a mineral containing arsenic (auri-pigment and realgar). To the west of Zarshuran are the three villages of Akdereh, at the gorge of a valley through which a road leads to a mountain pass of the same name. On the adjoining hills there is a lead-mine.

The south-east arm of the Saruk river, which is somewhat larger than the north-west, has its sources in the mountains of Takht-i-Belkis, where there are ruins of an ancient castle of the same name, and skirting

the Tavileh hill, joins the north-west arm of the Saruk and the small stream of Tikan Tepe; then taking a westerly direction, it joins the Jeghetu river at the foot of the lofty Seferkhaneh mountain.

The Tavileh hill which separates the two arms of the Saruk river has an altitude of about 2230 metres, and consists on the top of horizontal beds of the same limestone-tufa of which the wall of the fort is constructed. Underneath these limestones there are friable sediments of the Miocene gypsum formation, which cause the sides of the hill to be precipitous. I note this because the Persian gypsum formation sometimes contains petroleum and inflammable gases, which might perhaps have some connection with the "hill of fire"—Chiragh-Tepe.

As to the roads of Takht-i-Suleiman, they are, except that to Hamadan, more or less mountainous and difficult. From the villages of Akdereh a road runs over the pass due north through the hilly country of Hashterud to Ujan and Tikmedasht, on the high-road from Tabriz to Tehran, and another road is said to go from the pass direct to Basmindj and Tabriz, as well as one to Mianeh; but all these roads are little frequented. To the east a road goes over the mountainous country of Anguran to Zenjan, whereas another road is said to have been in use in ancient times over the plain of Sojas (Sohriverd?) to Sultanieh. The road to Sainkaleh goes as far as the village of Hasanabad along the bank of the north-west Saruk river, then over the hills and the pass of Mahinbulak (Magin-Bulak?), to the village of Sanjut, and along the valley of the Kaureh river to Sainkaleh or to the bridge of Kiz-Kopri and Souj-Bulak. To the south of the Mahinbulak pass, at the foot of a long flat hill, lie the caves of Kereftu.

Hamadan.—This lies about 1½ miles east of the Elvend mountains, on a plain inclined slightly to the north-east, at an elevation of about 1611 metres. On the eastern edge of the town rises the high isolated hill of Musallah on which there formerly stood a citadel, part of the walls of which can still be seen. Its flat summit is strewn with broken kiln-burnt bricks. To the south and east the Hamadan plain is surrounded by low hills; in the west the two peaks of the Elvend mountains rise suddenly to a very considerable elevation, and the main range behind them stretches in a long line from north-west to south-east. In the north the Hamadan plain extends for about 25 miles as far as a range of lower mountains, which separate the plain of Hamadan from that of Mehreban and Sarderud. The plain is abundantly watered by the Kara-su river and its many tributaries; numerous villages cover the valleys and the wide plain, in the north of which there are very fine pasture grounds.

Hamadan is a centre of many important caravan roads; here passes the ancient military highway to Babylon and Rhages (Rei); another road goes through Sehneh, Shehrizur and Kirkuk to Mosul (Nineveh), a third to Bijar, Maragha, and Tabriz, others to Zenjan, Kazvin, Qum, Isfahan, and Burujird, of which the last was in ancient times the highway

to Susa and at present leads to Disful. All these roads bear witness to the great importance Hamadan had in historic times.

We know very little about the foundation of Ecbatana. Ctesias relates that the city of Ecbatana had existed from the most remote antiquity, and to have been beautified and enlarged by Semiramis during one of her Asiatic journeys. It is interesting to note what Diodorus * relates of this legendary queen: that when she had finished the sculpture and the cuneiform inscriptions on the Baghistan rocks at Bisitun (which in reality were the work of Darius Hystaspis), she advanced to the town of Chauon (?) and there built a palace; she then proceeded as far as the Zarcaic (Zagros) † chain of mountains, where, to avoid the roundabout way, she had a road constructed which would lead straight over the mountain range to Ecbatana. Such a road still runs from the neighbourhood of the village of Assadabad, over a high pass of the Zagros range, and descends along the 'Abbasabad valley between the two Elvend peaks (Orontes) to Hamadan; whereas the easier carriage road rounds the mountains from the north side.

Diodorus further describes how, as the town of Ecbatana had only an insufficient supply of water, Semiramis arranged to improve it; he writes: ‡

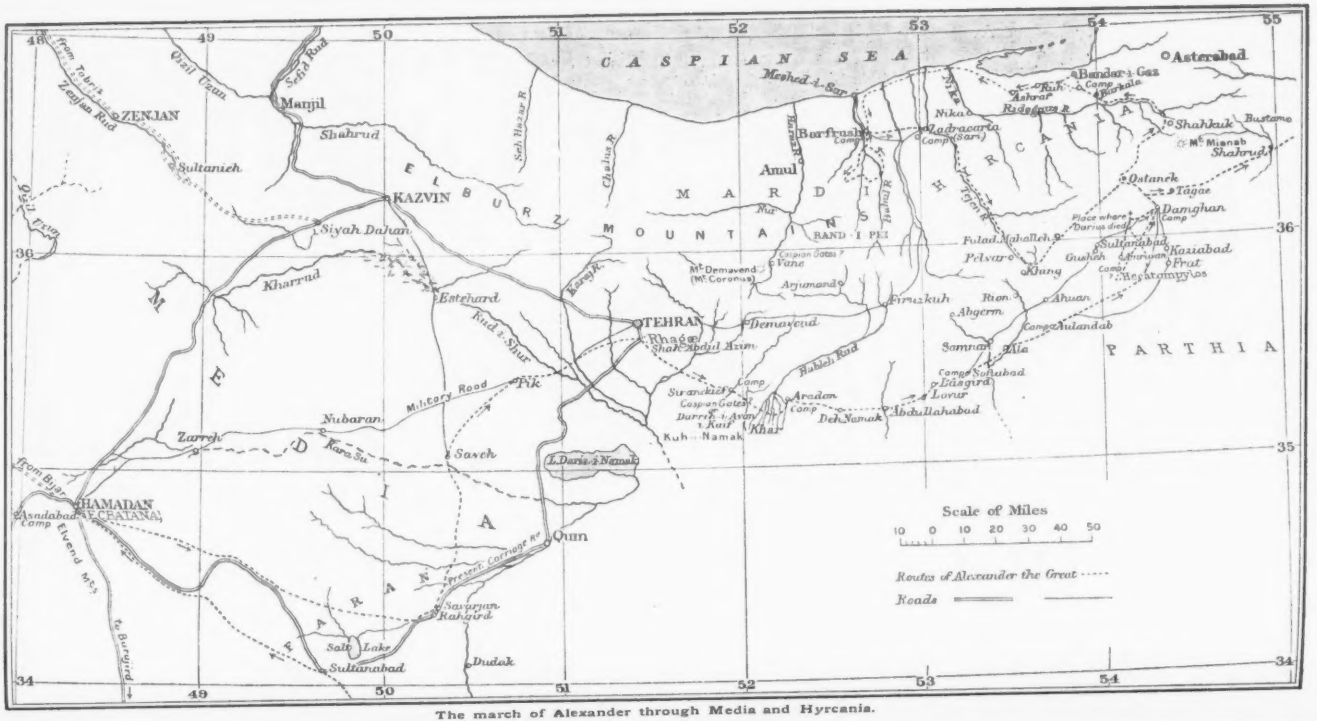
"... twelve stadia (2·22 kms.) from Ecbatana is a mountain called Orontes, which is distinguished by its roughness and its great height, rising abruptly for 25 stadia to its summit. As there was on the other side of the mountain a large lake, which issued in a river, Semiramis gave orders to construct a canal at the foot of the mountain 15 feet broad and 40 feet deep; through this canal she led the stream from the lake and supplied the town with water in abundance."

The cuneiform inscriptions of Darius and Xerxes, about 8 kms. to the south-west of Hamadan, in the 'Abbasabad valley, are engraved on a solitary granite rock. This rises out of a heap of sand and loose stones at the foot of a branch of the main range, just to the west of the northern Elvend peak, and on the right bank of a rapid stream, which flows in cascades from a neighbouring rocky valley and falls into the small 'Abbasabad stream. On my visit I had the impression that the rock with the cuneiform inscription was a monolith, and that the valley on the bank of which it stands was once blocked up by a stone avalanche. Such as is the cause, for instance, of the formation of the two alpine lakes to the east of Demavend. This would account for the possibility of an accumulation of water in the higher part of the valley, to make a lake, which had perhaps formerly an outflow into the stream of a neighbouring valley to the north of the place described and the Elvend

* Diodorus, ii. 13.

† Generally this mountain range is named Zagros; only Diodorus writes Zarcoeum. The root of this word might be either Zag= alum, or Zar = gold. Some gold has been found near Hamadan in these mountains.

‡ Diodorus, ii. 13.



The march of Alexander through Media and Hyrcania.

peak. A canal cut through the wall of the avalanche, would certainly have drained the supposed lake and increased considerably the quantity of water in the 'Abbasabad stream, which flows towards Hamadan. The construction of such a canal would also account for the position in such a desolate place, of the cuneiform inscriptions in which both kings glorify Ormuzd and themselves. Semiramis is also said to have built the splendid palace at Ecbatana, though Herodotus * says that Ecbatana was founded a good deal later than Semiramis, namely by Deiokas (708–655 B.C.).

Arrian writes †:

"When the news arrived [that Darius was still at Ecbatana], Alexander marched towards Media. . . . On the twelfth day he arrived [from Persepolis] in Media."

Here he was still at least three days' journey from Ecbatana. That would make at least fifteen days' march from Persepolis to Ecbatana. The distance from the ruins of Persepolis to Hamadan is about 775 kms., and fifteen days' would just be the time necessary for the journey; whereas from Hamadan to Takht-i-Suleiman is another 250 kms., or about five days' journey more. This, again, goes to prove that Ecbatana is to be identified with Hamadan.

One objection to the identification of Ecbatana with Hamadan is that Arrian mentions it took Alexander eleven days' heavy marching from Ecbatana to Rhagæ (Rei, 8 kms. south-east of Tehran), whereas, assuming Ecbatana to be the modern Hamadan, there would only be eight stages along the ordinary caravan or so-called Parthian military road (Babylon, Ecbatana, Rhagæ, Aria). But we must note that Curtius writes: ‡

". . . with this army he (Darius) deviated somewhat from the military road, after he had given orders to the baggage train and its escort to advance."

We find here, that Darius did not march along the ordinary road, which, being mountainous, was not suitable to carts or carriages. It is more than probable that he took a south-easterly direction along the broad plain at the southern limit of which the town of Sultanabad stands at present. The route leads first south-east, passing on the north the salt lake of Sultanabad (District of Farahan), and continues to the pass of Rahgird and Savarjan; then turns north and joins the present caravan road from Isfahan to Saveh and Kazvin. From Saveh it takes a north-easterly direction, and near the present village of Pik joins the military road from Ecbatana to Rhagæ.

The military road between the last-named towns measures about 310 kms., which make, for eight caravan stages, 35 kms. a day; whereas by the roundabout way which has been described the distance would be

* Herodotus, i. 98.

† Arrian, 'Anabasis,' iii. 19. ‡ Curtius Rufus, v. 24.

about 440 kms., *i.e.* for the eleven days of Alexander's march, 40 kms. a day. There can hardly be any doubt that Alexander followed Darius by the roundabout way.

Considering the high temperature in those low-lying desert plains at the end of May or the beginning of June, when Alexander's march took place, and the scarcity of drinkable water on the saline steppes, it is not at all astonishing that soldiers and animals suffered exceedingly, and that many of the former collapsed on the road or fell out, unable to continue the march. Perhaps also they were attacked by fever, which is not mentioned in the historical works, but exists at the present moment in such places all over Persia. On account of the heat, Alexander afterwards marched from Rhagæ only at night.

A further point in favour of Hamadan can be made from Arrian's remark on Darius' action after his defeat at Gaugamela: "Darius drove straight from the battlefield under the Armenian mountains to Media."* In my opinion, this means that Darius went up the valley of the present Lesser Zab river, and before reaching the Kurdistan mountains turned through Sehneh to Ecbatana (Hamadan). If Ecbatana is to be located at Takht-i-Suleiman, he would have been obliged to cross the mountains.

Rhagæ.—Having reached Rhagæ, Alexander remained five days and gave his men a rest. The position of Rhagæ is well known; the town was about 8 kms. to the south-east or the present Tehran, on the spot where we now find Shah 'Abdul 'Azim. According to Strabo it was 500 stadia distant from the Caspian Gates. The ruins are all of clay bricks and best preserved at the foot of the hills, on the summit of which some stone-built fortifications can still be traced. The ruins now bear the name of Rei, which might also have been the ancient native name. Once the largest town of Media, it has several times been destroyed by earthquakes and Mongol invasions. In the year 1404 Ruy Clavijo found the town in ruins; but it was rebuilt once more, and in 1427 became the residence of Shah Rukh, the son of Tamerlane. After his death the town fell finally into decay.

The present capital of Persia, Tehran, did not exist in Alexander's time, and the Tehran of which the Arabian geographer Jakut (*c.* 1180) wrote that its inhabitants are troglodytes and in constant feud with the inhabitants of Rei, was, so far as I could ascertain, a district to the east of the Demavend volcano. A village of that name still exists in the valley of a stream which comes down from the mountains of the district of Band-i-pei in the Elburz range.

The Caspian Gates.—Arrian continues: † "He himself (Alexander) went further on in the direction of Parthia. The first day he camped at the Caspian Gates. . . ." The Caspian Gates (Caspiæ portæ) have served for an important ancient geographical landmark and the principal meridian from which the Greek geographers like Eratosthenes

* Arrian, 'Anabasis,' iii. 16. † *Ibid.*, iii. 20.

and Strabo calculated the distance of a number of towns. But the descriptions of their position which the Greek authors give are vague.

The Greeks gave the name of "gates" to certain mountain defiles and passes; so Diodorus writes in his historical work: *

"... Persia, Susiana, and the so-called Caspian lands, into which lead only narrow passes, which therefore are named 'Caspian Gates.'"

Arrian writes †:—

"This place (Rhagæ) is for a traveller of Alexander's speed one day's march from the Caspian Gates."

The Caspian Gates in question are doubtless the defiles of Sialek and Sardar, which are about 70 kms. south-east of the ruins of Rei or Rhagæ (about 52° east of Greenwich) and cut across the Kuh-i-Namak or Salt mountains—a low range of hills, which branches off from the Elburz mountains. The Sialek defile is the northern one, and is at present blocked by landslips; it is narrow and runs between steep walls. The Sardar defile (885 metres altitude) is somewhat more to the south. The entrances at both ends are about 20 to 25 yards wide, with steep mountain walls on both sides and an exceedingly salt stream running through; in the centre it widens to a small circular valley, where are the ruins of an ancient stone tower. At the north-western entrance there are also traces of some ancient brick buildings. The length of the defile is about 10 kms.

The importance of these defiles consists in the geological character of the range; it is of easily disintegrated Miocene rocks, which by erosion have been cut into innumerable ravines and make such a mass of tumbled hills that to pass the range in any other place than the defiles would be a very difficult task. Moreover the range, which on the south is bounded by salt swamps and deserts, is an effective barrier between the western and eastern parts of the road and was once the boundary between Media and Parthia.

On the other hand, Strabo writes: ‡

"... and Rhagæ itself, a foundation of Nicator, which he named Europus, but the Parthians, Arsacia. It is about 500 stadia to the south of the Caspian Gates, as Apollodorus of Artemita reported."

In another places he writes: §

"Media is for the most part high and cold, and so too are the mountains situated over Ecbatana and those which are about Rhagæ and the Caspian Gates; ... but the part [of Media] below the Caspian Gates, which consists of low-lying valleys, is very rich, producing all sorts of crops except the olive."

Here the defiles of the Kuh-i-Namak cannot be intended, and the Caspian Gates of Strabo can be only the defile of the Heras-pei river,

* Diodorus, ii. 2.
† 'Anabasis,' iii. 20.
‡ Strabo, xi. 13, 6.
§ *Ibid.*, xi. 13, 7.

north-east of Rhagæ, at the foot of the Demavend volcano (the ancient Coronus Mons). It is possible that Apollodorus knew this defile and pass also as the Caspian Gates, and as it leads to the Caspian Sea it has perhaps more right to the name than the defiles of the Kuh-i-Namak, but the Caspian Gates through which Alexander marched are the Sialek and Sardar defiles.

Death of Darius.

The site of the first camp of Alexander, after his departure from Rhagæ, must have been the present Aivan-i-Kif, as it is the only place thereabout where fresh water could be procured.

We continue to quote from Arrian's account :

"... on the second day he (Alexander) advanced through them (the Caspian Gates) as far as human habitations extended."*

That means that after passing the defiles he crossed the district of Khar, the ancient Choarene, and advanced probably as far as the present village of 'Aradan, which even now has the aspect of an ancient fort with high clay walls. It might have been formerly a small town, since close to it is a place called Atishgah, or "Fire-place," that is, a former fire temple of the Zoroastrians.

Arrian: "... taking with him only his companions, the light cavalry scouts, and a selection of the strongest and lightest-armed men of the infantry, without waiting for the return of the detachment of Coenus from its foraging expedition. ... Over the army left behind he set Craterus with orders to follow by moderate daily marches. His own following had with them arms and provisions for two days only. Thus he advanced throughout the night and until the following midday. ..."†

This account implies about fifteen hours of continual march. The road to the east of 'Aradan goes over hilly waterless country, flanked on the north by high rocky mountains, and on the south by salt swamps and desert plains. About 25 kms. east of 'Aradan is now a small village, Deh Namak, which has only brackish water, and about 35 kms. further is the village 'Abdullahabad, with some better water. About 25 kms. still further in the same direction is a stream of fresh water, on the bank of which now stands the caravanserai Lovur. Both the last-named places can be taken into consideration for Alexander's camp; but I am of opinion that 'Abdullahabad was the place where the camp was, as the men on foot could hardly do more on such cut-up ground during the fifteen hours' march.

Arrian: "he then let his army rest for a little while, and resumed the march throughout the night and arrived at daybreak at the camping-place from which Bagistanes had started his retreat. ..."

During this march he could hardly have covered more than 60 kms., though the country, except for a small pass over a range of hills between

* Arrian, 'Anabasis,' iii. 20. † *Ibid.*

Lovur and the village of Lasgird, which stands on an artificial elevation, is a plain. He probably camped at some place to the south-west of Samnan.

Arrian: " . . . Artabasus, his sons, and the Greek mercenaries excepted. These had remained true to Darius, but had not the power to stop the progress of things; they therefore had turned off the highway and by themselves sought the mountains." *

The Greek troops doubtless went in the direction of the present Firuz-kuh, where are ruins of an ancient castle or fort.

Arrian: ". . . he continued his march, covered a considerable distance during the night and up to the following mid-day, and arrived then at a village, where those who were conducting Darius had camped the day before; . . . he asked the inhabitants if they knew some short cut by which to follow the fugitives." †

This village could have been only in the valley of the Rion river or in the Vardimek mountains, which separate the plain of Samnan from that of Damghan and protrude from the main range of the Elburz mountains to the south-east.

Arrian: ". . . . On their declaring that they knew such a road, but on account of the absence of water it was a desert, he ordered them to lead him this way. Knowing that the infantry would not be able to follow his forced march, he dismounted 500 of his cavalry, chose the ablest leaders and soldiers of the infantry, and bade them mount the horses armed as they were. . . . [Two captains] received the command to follow along the road which Bessus had taken. . . . He himself took the road again about evening and advanced at a swift trot. He covered thus about 400 stadia [74 kms.] during the night, when about dawn he came up with the enemy, who were advancing without order or arms. . . ." ‡

To explain the situation, we must presume that Alexander passed to the south of Samnan, on the road from the present villages in the mountains of Vardimek or the valley of the Rion river.

From these places there are three roads leading in the direction of Damghan. The northern, the so-called Parthian military road, crosses the mountains to the caravanserai of Ahuan, and thence goes on to the village Gusheh (Sultanabad) and the district of the present Qumish—the old Comisene. On this road only the interval between Ahuan and Gusheh is waterless and level steppe. A second road runs more to the south. After passing the mountains it goes between a group of isolated hills on the north and the Kuh-i-Sultan Shah Rukh on the south, through a waterless desert, where only on the eastern slope of the Vardimek mountains are two small springs. From this point for about 70 kms. as far as Damghan no fresh water is to be had; and it is about 60 kms. from the springs to the village of Kaziabad, on the road from Damghan to Frat. The third road rounds the Kuh-i-Sultan Shah Rukh and the

* Arrian, 'Anabasis,' iii. 21. † *Ibid.*

‡ *Ibid.*

Benober mountains from the south, and, with several springs on the way, leads direct to Frat.

Bessus marched by the military road over Ahuan and Gusheh, whereas Alexander took the second, the desert road. He came upon the enemy somewhere near the large group of villages of the district of Qumish.

That the army of Bessus marched without arms is not astonishing; I have frequently met marching Persian regiments who walked without order and had donkeys to carry their arms. It seems to be a very old custom.

Arrian: ". . . Bessus and his companions of conspiracy dragged Darius with them for a while in a travelling waggon; but as soon as Alexander came up, Nazabanes and Basaentes who had wounded Darius abandoned him there. They themselves with 600 horsemen fled, but Darius died of his wounds soon after, before Alexander had seen him. . . ."*

Curtius† gives a somewhat different account of the facts; he writes:

"But Bessus and the others who were implicated in his crime, caught up the car of Darius and began urging him to mount a horse and get clear of his enemy by flight; but he called on the Avenging Gods to take note, and invoking the protection of Alexander declared that he would not accompany the parricides. On this, in a burst of anger they hurled darts at the king, and left him prostrated by many wounds. They also foundered the draught mules, so that they should not be able to advance, and killed two slaves who were accompanying the king. Having accomplished this deed, Nazarbanes made for Hyrcania and Bessus for Bactra, each with a few horsemen so as to leave few traces of their flight. . . . None of [Alexander's] prisoners could show the car of Darius: every vehicle as it fell into their hands was separately searched, and still no trace of the king was found.

"Meantime the animals which were drawing Darius, feeling no rein, had left the military road and wandered about 4 stadia till, exhausted from the heat as well as their wounds, they stopped in a valley. Not far away was a spring, to which tortured by thirst came a Macedonian, by name Polystratus, who had been directed by some one who knew the country, and as he drank the water, which he had drawn in his helmet, he noticed spears sticking in the bodies of the dying draught cattle. Astonished that it should have been preferred to founder these animals rather than drive them off. . . ."

Here the manuscript of Curtius breaks off; but the remainder of the tale has been supplemented from the writings of Justinus, Diodorus, and Plutarch.‡

From Curtius we learn that Darius was murdered not far from the military road—doubtless to the south-west of Damghan. The valley to which the car with Darius was dragged must have been on the south-east side of the present Sefid-Kuh mountains, from which water is drawn to irrigate the fields of the villages of Qumish, and somewhere to the north of the present villages of Taziabad and Ahzabad.

* Arrian, 'Anabasis,' iii. 21. † Curtius, v. 37, 38

‡ Darius died about July 330 B.C.

Arrian's account states: ". . . Alexander now drew together those parts of his army that had remained behind and then advanced towards Hyrcania. . . ."*

Hecatompylos.—According to Diodorus, Plutarch, Curtius, and others, Alexander and his army, after their great exertions in the last forced marches,† took a rest in Hecatompylos and its environs. Polybius, Appian, and other authors mention that Hecatompylos, later on the residence of the Arsacids, was at a point of divergence of several roads. From this fact comes the Greek name which was given to it by Seleucus I. instead of the native name unknown to us.

The real position of this ancient town is still a puzzle to us; some authors think it was at Damghan; others put it on the site of Bustam; and others again even as far away as Jajarm; but only Damghan corresponds to the facts mentioned below, and even Damghan leaves a certain doubt. The Greek geographers counted 1260 stadia or 233 kms., distance from the Caspian Gates to Hecatompylos. Now Damghan is reckoned to be about 262 kms. distance from the defiles of the Kuh-i-Namak or the Caspian Gates which Alexander passed; whereas Bustam and Jajarm are much too far east.

Curtius writes:‡ "On the third day [after leaving Hecatompylos] of his march through Parthia, he [Alexander] arrived at the boundary of Hyrcania [Varkana], having left Craterus with the troops under his command and the detachment which Amyntas led, and also 600 horsemen and as many archers in order that Parthia might be fortified against an invasion of the Nomads. To Erigyius he gave orders to forward the baggage under a small escort along the plain road; he himself with the phalanx and the cavalry advanced for another 150 stadia (28 kms.), and then fortified a camp in a valley which gave access to Hyrcania. There rises a dark forest of very high and dense trees; the soil of the valley is rich and irrigated by springs which flow from the rocks which rise above it. At the base of the mountain-chain rises the river Ziobetis, which flows for about 3 stadia undivided: then, rebounding from a rock which interrupts the river-bed, it parts its waters into two halves, of which each flows a separate way. From this point becoming a rapid stream of all the greater violence for the rough rocks between which it flows, it plunges underground and flows invisible for 300 stadia (56·4 kms.). After that it breaks out again at another spring and forms a new river-bed, more spacious than that of its upper course, for it flows with a breadth of 13 stadia (2·5 kms.); thereafter it is once more squeezed between narrow banks and reduces its course, till at the end it discharges into another river called Ridagnus."

This boundary between Parthia and Hyrcania, as well as the rivers mentioned, Ziobetis and Ridagnus, are important landmarks, which we must trace and fix before we discuss the position of Hecatompylos.

To the north-west of Damghan rises the Sefid-kuh range, and to the north the Soldar mountains, which are divided by the defile Damghan–

* 'Anabasis,' iii. 23.

† He had passed eleven ordinary daily stages in something like six days.

‡ Curtius Rufus, vi. 10.

Astaneh. Behind these mountains stretches the long and broad valley of Fuladmahalleh–Chashmeh-i-'Ali–Chehardeh. This valley is flanked on the north-west by a range of mountains, which represents the boundary between the province of Damghan—the ancient Parthia—and the district of Hazar-Jerib, or Tabaristan, the former Hyrcania, or at least part of it. The south-eastern slope of the boundary range, as well as all the country to the south of it, is destitute of any vegetation except that produced by artificial irrigation; whereas the north-western slope of the mountains, as well as the whole country down to the Caspian Sea, is well wooded and has altogether a luxuriant vegetation.

Near the meridian of Damghan, this S.W.–N.E. boundary range takes a W.–E. direction, and at the mountain-knot of Mian-ab, where the rivers Dorudbar, Shahkuh, Mujin, Tazireh, Chehardeh, etc., have their sources, divides into two ranges, of which the northern consists of the mountains Shahkuh, Shahvar, and Belamberan, striking S.W.–N.E. and ending at the valley of Abri. The second range consists of the Tapal mountains, which strike W.–E. and are cut by the defile Shahrud-Bustam.

Where the boundary range turns to the east, and the road from Damghan to the village of Shahkuh crosses it, is a river called Dorudbar (Turudbar; = two river-beds); on the right bank of it at this place, extending as far as the rivulet Bar-kuh, is an open valley, still covered by a forest of high old juniper trees. In fact it is the first forest that we meet coming from the south. As to the Dorudbar river, the first part corresponds to the description which Curtius gives of the upper course of the Ziobetis river: on its lower course it runs along a narrow cleft of rocks, named Shamshir-Cur (= cut by the sword). This cleft might not have existed at the time of Alexander, and could have been produced later on by earthquakes, which in this district are very frequent,* therefore it is possible that in Alexander's time the river flowed partly underground,† and that this is the Ziobetis river, as no other exists in this part of the country or east of it, which would answer so well to the description. The valley with the juniper forest was perhaps the place where Alexander camped before entering Hyrcania; it would be difficult to find in these rough mountains a place more adapted for a large camp.

The Dorudbar at some distance from its source joins the Shahkuh river, then flows through the broad valley of Asp-u-nizeh and the plain of Rudkan (about 25 kms. broad), where at the foot of the mountains are the ruins of an ancient tower with a conical cupola. Then the river bed is again squeezed in between rocks and opens near the present

* The village of Tash to the east of this place is an earthquake centre, and about every five years suffers from earthquakes. In 1890 it was totally destroyed, but again rebuilt.

† Crossing in 1906 from Firuzkuh over the mountains to Barfrush, I passed in one place a cleft of the rocks in some places only about 1–2 yards broad, 1000 feet high, and 2 kms. long, on the base of which a rivulet flowed through a tunnel of about 10 yards in breadth and height.

caravanserai Barkala, where it joins the river coming from Iunezar. The valley then broadens again considerably, and the river, which here bears the name Nikah, after flowing westerly from Barkala for about 70 kms., issues into the Caspian coast plain; here it is sometimes called Gauher-Baran river. Probably the Nikah river with the Iunezar, was called in ancient times by the Greeks "Ridagnus"; whereas the Dorudbar Asp-u-nizek river was the Ziobetis.

If we consider that Alexander took three days to reach the boundary of Hyrcania from Hecatompylos, and 28 kms. more to the camp in the forest, it is evident that Damghan could hardly be the ancient Hecatompylos, as from it to Chashmeh-i-'Ali or Chchardeh would be only one day's march. These places must be considered to be near the boundary of Hyrcania, hardly two days' journey; whereas from Chehardeh to the presumed camp at the Dorudbar would be about the 28 kms. mentioned. Moreover Damghan is no greater road junction than Samnan, Firuzkuh, or Bustam, and the few roads that cross there could have hardly given the town the name of a hundred gates.

Ruins which might indicate the position of an ancient town are unknown in the environs of Damghan. All these considerations have led me to the following supposition:

Once when I was following the old military road from Samnan to Damghan, I noticed to the south of Gusheh a group of isolated hills of peculiar form, and noted them on my map.* These isolated hills, of which there are quite a number, encircle a plain of elliptical form; the plain inside I estimated to be 10–15 kms. long and 3–4 kms. broad. It afterwards struck me that these hills might possibly enclose the ruins of the ancient Hecatompylos, and that the many apertures between the hills had given the impression of gates, from which the name "Town of a Hundred Gates" had been derived. The place is now desolate and without water supply; but through the Tueh-Dervar valley to the north of Gusheh flows a very abundant stream, so that the valley, over 10 kms. long, is so well irrigated that it resembles one long park. This stream might possibly in former times have been led into the plain inside the said hills.

So far as I know, no European has ever explored this spot, and therefore I should recommend some future traveller to take the trouble to visit it from Gusheh, so as to ascertain if there are any ruins on the plain between the isolated hills, and if my supposition is right.

This possible position of Hecatompylos would not only explain the three days' journey to the boundary of Hyrcania, but it would also agree with the distance of 1260 stadia from the Caspian Gates, as calculated by the Greek geographers.

Curtius continues†: "Already having given four days' rest to his soldiers

* *Petermanns Mitteilungen*, Gotha. Ergänzungshaft No. 118.

† Curtius Rufus, vi. 11, 12.

on the same spot . . . he marched, with his troops ordered in squares: . . . the warlike population, as well as the difficult and inaccessible natural character of the country, kept the king uneasy. For it is one long uninterrupted valley down to the Caspian Sea, into which, as it were, two arms of it project, enclosing between them a bay of moderate curve that greatly resembles the moon when its disc is not yet full and its horns project."

This description fits admirably the valleys of Asp-u-nizeh and Nikah and the bay of Asterabad.

After leaving the camp on the Ziobetis river, Alexander probably passed through the defile of the Shahkuh valley into the broad valley of Asp-u-nizeh and camped during the four days specified on the plain of Rudkan, near the short defile of Barkala.

Curtius:* "From here the King advanced 20 stadia (3·7 kms.) on a nearly impassable path, with a forest hanging over it and torrents and gutters impeding his march; but as no enemy opposed him he got through, and at last arrived in cultivated land. . . . There grew many trees, which had the appearance of oaks; but from their leaves honey dropped abundantly. If the inhabitants do not collect this juice before sunrise it dries up even though the temperature be moderate."

It is clear that, from his camp at Rudkan, Alexander advanced to the present village of Barkala, and from thence went over the forest-covered ridge which separates the valleys of the Asp-u-nizeh and Nikah from the low lands of Asterabad bay. This he observed from the top of the ridge, whence it looks exactly as Curtius describes it. This path, though much frequented at present by caravans from Shahrud and Bustam to Bandar-i-Gaz, is still in just as bad a condition as it was at the time of Alexander.

On the northern side of the ridge Alexander entered the plain of Bandar-i-Gaz (= Shore of Gaz), a small town and port on the Caspian Sea. "Gaz," or "Giaz," is the Persian term for a sort of manna; a sweet juice which, as a result of perforation by insects, flows out of the leaves of a certain sort of oak, and when dried is like sugar. This "gaz" is largely collected in Kurdistan, and at Isfahan is used for the manufacture of a sort of sweet also called "gaz."

Curtius†: ". . . 30 stadia (5·5 kms.) he advanced from here . . . and arrived at the city of Arvæ."

Though the distance indicated is exactly that from the foot of the ridge to the town of Gaz, it is impossible to ascertain whether Gaz is the same as Arvæ, or whether there was another small town of that name between Gaz and Ashraf. I remember that a place on the bank of a dry river-bed, somewhere about the village of Ruh, was named to me: "Kohne-shehr," *i.e.* old town.

Further, Curtius describes the progress of Alexander in a western direction against the Mardi, whom he defeated, and writes:‡

* Curtius Rufus, vi. 13. † *Ibid.*

‡ *Ibid*

". . . From this point he returned on the fifth day to his camp. . . . They had already arrived at the city of Hyrcania, where the palace of Darius stood."

It is impossible to say what town is meant. If it is Ashraf, the palace is that which is still standing (restored by Nasir-ed-Din Shah) to the west of the town on a high projecting rock overlooking the Bay of Asterabad, and which is said to have been at times the residence of the kings of the Safi or Safavi dynasty. Or it might be Barfrush, where a palace had stood on an artificial island surrounded by a broad ditch. On the south side of this town is a large site square in shape and artificially raised, where once perhaps a camp has been. If this was the camping-place of Alexander, five days would not be too much for him in which to defeat the Mardi and to return to the camp. On the other hand Strabo * mentions a king's residence called "Tape," which stood only a little above the surface of the sea and was 1400 stadia (259 kms., distant from the Caspian Gates. The Turks call a hill "Tepe." In this part of the country is an artificial hill called "Qara-tepe" (black hill), 7 kms. to the north-west of Ashraf and about the distance required from the Caspian Gates *viâ* Firuzkuh and Sari.

Arrian writes: † ". . . he himself with the archers marched through the defiles and then camped in the valley beside a river of no great size."

It is difficult to say whether this camp was the one at Rudkan or one on the northern side of the ridge and passes near Gaz. The last may be more probable.

". . . For four days Alexander remained in camp. . . . Thence he started to advance into Hyrcania against the town of Zadracarta. . . ."

Here Alexander was joined by Craterus, who had passed the land of the Tapurs, probably by the route Astaneh, Fuladmahalleh, Pelvar and along the Tejan river, by Erigyius with the baggage animals and carriages, who could only have come from Fuladmahalleh over the Alpine pastures of Khing and Aseran and the valley of the Talar; and also by Artabazus with his sons, coming from Firuzkuh, where the Greek soldiers of Darius, after leaving him near Samnan, had remained.

Arrian: "He himself moved against the Mardi. . . ."

After the defeat of the latter, he returned to the camp from which he had advanced against the Mardi. He then arranged everything necessary for the administration of the conquered country, and—

Arrian: ‡ "After all this had been arranged, he led his army to Zadracarta, the largest town of Hyrcania, where was the palace of the Hyrcanian kings. Here he remained fifteen days . . . and thence advanced towards Parthia. Thereafter he passed into the district of Aria and reached Susia (Tus?), a town of the Arians. . . ."

* Strabo, 508. † 'Anabasis,' iii. 23. ‡ *Ibid.*, iii. 24.

We have followed the march of Alexander more or less satisfactorily as far as the coast of the Asterabad bay at Bandar-i-Gaz; from here he advanced in a westerly direction towards Zadracarta against the Mardi. From this point the description of his movements, given by the Greek historians, leaves much to be desired.

The so-called Amardi or Mardi are said to have inhabited the higher mountains of the Elburz from about the Qizil Uzun and Sefid Rud rivers in the west as far east as the boundary river between Media and Hyrcania, named Charinda. Some authors suppose that Charinda is identical with the present Haraz river, which has its source in the Demavend mountain, flows through the town of Amul, and falls into the Caspian Sea; but this can hardly be the case, since the easiest and, even during the winter, the most frequented road from Media to the Caspian lowlands runs through the Caspian Gates (Kuh-i-Namak defiles) and Choarene (Khar) up the present Hableh Rud to Firuzkuh, hence over the easy Gaduk pass and down the valley of the Talar river to the Caspian plains (Mazanderan). As the name Charinda (Kharinda) indicates, there must be some connection between it and the district of Choarene (Khar), and Charinda was probably the ancient name of the Talar river. The name "Talar" must have been derived later on from the place which Strabo calls Talarbroca, and describes as a large open town with a castle situated on the northern part of the mountains. Probably the inhabitants of the present districts, Chelab, Shirgah, Band-i-pei, and Savad Kuk, were named Mardi; whereas the inhabitants of the east of the Talar river were the Tapurs of Hyrcania.

Moving from the district of Bandar-i-Gaz, Alexander passed Ashraf and Qara Tepe; then, going along the shore of the sea to avoid the thick woods and low moorlands between the mountains and the sea, and leaving Zadracarta to the south of his road, he advanced near to the present Meshhed-i-Sar (Mandagarsis?); then he turned to Barfrush (Samariana or Saramanna?),* where he pitched his camp and where he undertook his expedition against the Mardi probably up the valleys of the Babul and Surkh Rud rivers. The five days which this expedition lasted could not have taken Alexander very far into the mountains. From this camp he advanced to Zadracarta, where he stopped fifteen days.

The capital of Hyrcania is called Zadracarta by Arrian, Karta by Strabo, and Syrinx by Polybius. It was not far from the source of a small river. There are many facts which support Sari's claim to be Zadracarta (Zerd-karta, Sari-Karta).† It is about half a kilometre to the west of the Tejan (Maxera) river, at its exit from the mountains and near the sources of a smaller river which passes it on the west. The town stands higher than Barfrush, and even now it is a considerable

* Or Orocana?

† Sare-Karta or Sari-Karta = Head-town.

place with a palace of the Shah where the governor of Mazanderan lives.

From Zadracarta Alexander advanced probably by the road up the Tejan river over Pelvar, Fuladmahalleh, and Astaneh; and issuing from the defile of Astaneh-Damghan, he passed the present Taq or Tagh and continued his march along the military road to Aria.*

It is strange that, if Damghan were identical with Hecatompylos and situated on the military road, it should not have been mentioned, when Alexander passed it so near on his return from Hyrcania.

THE BAHR-EL-ARAB

M. J. Wheatley, Governor of the Bahr-el-Ghazal Province

IN vol. 61, No. 5, of the *Geographical Journal*, May 1923, there is an account of a lecture by Dr. Cuthbert Christy on "The Bahr-el-Ghazal and its Waterways," and on pp. 328–32 is a discussion of what little was then known of the Bahr-el-Arab and the importance of determining its navigability. I have recently, with Lieut. J. M. Stubbs, 3rd Hussars, followed the course of this river from approximately meridian 27° to meridian 25°, that is to the junction of the rivers Adda and Umbelacha, which together form the Bahr-el-Arab. Thence we followed the Umbelacha to Hofrat-el-Nahas. The following description of the river is going upstream.

The Bahr-el-Arab at the point where we struck it at Safaha, roughly in long. 27° E., was in April about 40 yards wide and 10 feet deep. Going westward the water gradually shallowed for about 18 miles until the bed was quite dry. The channel was then about 12 yards wide and 10 feet deep, and extremely circuitous, so much so that navigation would be quite impossible. After about another 18 miles the channel begins to open out again and to become shallower. It continues to broaden until it reaches a width of as much as 120 yards and is some 6 to 8 feet deep. The sides and bed are sand. There were numerous pools of water, many of them very deep and full of fish. At the many bends in the course there are large accumulations of sand, and at the convex bank of these bends the channel is quite shallow. In our opinion even this section of the river would be difficult to navigate, and it could be accomplished only during high flood. The reason for the above change in the size of the river is undoubtedly the fact that for about 30 miles the water spills out over the country and annually floods a large area. This

* Alexander marched to "Susia," supposed to be the former town of "Jus," the ruins of which are situated about 20 kms. to the north of Meshed and from here to Kuchan (Alexandria), from where he advanced to the place called "Dare," probably the defile and pass which now leads to 'Ashqabad, and then turned towards Kelat and Herat (Artacoana), the capital of Aria.

results in a much smaller channel being required to carry the stream below the inundated area, which it should be understood is quite distinct from the swamps found lower down the river's course. During five months of the year the Arabs of Darfur feed their cattle on the magnificent grazing of this inundated area. We also saw vast herds of game—white-eared cob, Jackson's hartebeest, tiang, and roan. Reedbuck, bushbuck, and various species of gazelle were also seen. Buffalo were plentiful, and elephant tracks, many evidently made by large herds, were continually met with. Hippopotamus live in many of the deeper pools, and ostriches were seen twice. Waterfowl of all sorts abound on the various khors and open water formed by the river when overflowing.

At 161 miles from our starting-place the river runs through a rocky defile about 400 yards long. We considered that this would be very difficult to navigate.

It will be realized from the above that the Bahr-el-Arab is a disappointing river, and that the surmises as to its utility as a navigable waterway have been due to erroneous, or rather incomplete, information. We cannot corroborate Gessi's estimate of the width of the river as mentioned by Dr. Christy. At no point did we find it more than 360 feet in width. Perhaps Gessi struck it at a spot where there were inundations. The "dulep" trees referred to by Gessi are doleib palms, which are found all along the more western reaches.

The Umbelacha for 50 miles before its junction with the Adda is narrow, deep, and very winding, and quite unnavigable by a steamer. A voyage in a launch would be exciting owing to the many hair-pin corners. Lieut. Stubbs mapped our track, which crossed and recrossed the river, by wheel and compass. This work will be submitted to the Survey Department of the Sudan Government for inclusion in the next edition of the map.

A good deal of new information has recently been obtained about the mouth of the Bahr-el-Arab. Many attempts have been made to find the mouth from the Bahr-el-Ghazal, but in vain, and the concensus of opinion, with which Dr. Christy told me he concurred, is that if there is a mouth it is eastward of the so-called mouth at Ghabat-el-Arab. Major Titherington, Oxford and Buckinghamshire L.I., has twice within the last two years made journeys right across the country through which the Bahr-el-Arab is supposed to flow between meridians 29° and 28°. He has informed me that nowhere did he meet with any defined channel which would indicate that it was the course of a definite stream. The whole country is a vast swamp intersected by khors and with open spaces of water here and there. The Dinkas who inhabit the district told him that they knew of no river passing through the area. The investigations of the late Mr. Lubbock, of the Sudan Survey Department, in 1913 seemed to support this information. It would appear that the late Commander

Huntley Walsh, referred to by Dr. Christy, navigated one of the khors draining the swamps into the Bahr-el-Ghazal river. I suggest that the Bahr-el-Arab, like to the rivers Gell, Naam, Lau, etc., in the centre and east of the Province, peters out into the swamps and has no channel through those swamps like the "Narrows" of the River Jur. Colonel Lyons' remarks, made on the conclusion of Dr. Christy's lecture, would therefore appear to be sound, and I agree with him that there is little cause to be optimistic as to the ultimate development of this particular system of waterways.

I should like to take this opportunity of saying how heartily I agree with Dr. Christy's far-seeing outlook on the possibilities of future agricultural development of the flats of the sudd region. In addition to cotton and date palms I suggest cattle-breeding on a similar scale to that in the Argentine. There are always grass and water. A canning factory at Wau, the capital of the Province on the River Jur, would then possibly be a profitable venture. Perhaps I should mention, with regard to the remarks of the old officials of the Province who spoke at the end of the lecture, that the administration is now in touch with all the Dinkas of the area in question, and controls them as closely as a totally inadequate staff can manage. Given time, it is my firm conviction that this part of the Sudan has a great future before it.

AUSTRALIAN SETTLEMENT: REVIEW

Geography and Australian National Problems.— Prof. Griffith Taylor. Pp. 433–87 of the Report of the Australasian Association for the Advancement of Science. Vol. 16. 1923. Wellington, N.Z. 1924.

THIS is a reprint of the Presidential Address to Sect. E (Geography and History) of the Association; and before proceeding to his special topic Prof. Taylor gave a summary of recent contributions to the geography of Australasia which should be of value to students in this country, where some of the publications referred to are only accessible in the larger reference libraries. He also advocated the establishment of an Australian geographical journal and provided for it a "slogan" in the phrase "the scientific study of the controls governing Australian settlement." This slogan expresses concisely his conception of the functions and aim of geography; and the paper before us is an application of it to some problems of Australia's development. Parts of the paper are strongly controversial, and it should help to stimulate and focus further research on the problems it touches.

The methods of study employed are essentially geographical. The available statistical and other information relevant to the problems considered is expressed cartographically as far as possible; the resulting map-diagrams are shown directly and, where it is appropriate, placed side by side or superposed; and most of the discussion is based on these and other diagrams, of which there are sixteen in all, several of them multiple. It is unfortunate that the standard of the draughtsmanship is generally unworthy of the paper; and if the diagrams are republished elsewhere it is to be hoped that most of

them will be redrawn: Fig. 13 is the worst in this respect. The projection employed is usually not stated, nor are scales shown, nor any net of meridians and parallels.

The study is mainly concerned with the less-favoured parts of Australia; for the reasons that "no one doubts the value of the well-watered cooler coast lands," and that these are well known. It really begins in section 2, on the Distribution of Population, with two maps showing recent changes in density of population in New South Wales (Fig. 2), and, in less detail, in the eastern half of Australia (Fig. 3). Both show very clearly the movement from arid to well-watered areas in the last three decades, and that the increase in population is almost wholly in the coastal belt of the south-east, a fact which has important bearings on Australia's world relations and the increasing dominance of the two great cities of Sydney and Melbourne. There was also a diminution in the small white population of the Northern Territory from a maximum of 4803 in 1917 to 3992 in 1920, and 3554 in 1922.

The geographical factors to which attention is specially directed are those of climate—in its effects on the health, efficiency, and comfort of the white settlers, and on the agricultural and pastoral value of the land—of soils and of communications. Altitude is treated mainly in relation to climate. In discussing climate and health the author generally adopts the views of Dr. Ellsworth Huntington. In respect to comfort, he is chiefly concerned with wet-bulb temperatures as the available means of measuring the conditions which cause physical discomfort in hot lands; and he regards a mean wet-bulb temperature of more than 65° F. for more than half the year as marking at present the practical limit of white settlement; for the sound reason that settlers will not go to the "uncomfortable" regions so long as there are abundant space and opportunity in "comfortable" lands.

Prof. Taylor describes his dozen years of study of Northern Australia as "one long period of disillusionment" (p. 453). There are no luxuriant forests west of a narrow fringe along the east coast; since everywhere west of this there are at least six months of continuous drought. The best lands are grass-lands with scattered trees of types adapted to survive the long dry season. Where the rainfall is seasonally abundant the soils are usually very poor. Most of the rivers disappear, or are reduced to strings of pools, for several months of the year. There is very little high land, the only high area of any importance being the Atherton plateau in north-east Queensland, which has an area of about 12,000 square miles above the altitude of 2000 feet. The result of these facts is best summed up in the following statement of the total white population of Australia north of the tropic of Capricorn (p. 452):

East coast lands of Queensland	100,000
Inland Queensland, mostly in the east	70,000
Northern Territory	4,000
West Australia	5,000

i.e. Northern Australia contains 3 per cent. of the population of the Commonwealth on 40 per cent. of its area.

Section seven of the paper is given to a consideration of the "Deserts and Arid Lands." A summary of the views of several writers, scientific and otherwise, and a study of the extreme variability of the small rainfall of these lands, lead to the important conclusion that careful study of reliable records of the rainfall and temperature of such regions is a safer clue to their economic possibilities than any visit of inspection or reconnaissance by itself can be.

Here Prof. Taylor speaks from experience, and his views deserve respect. On Koeppen's map of the Desert Regions of the World, on which Fig. 13 is based, the author has measured the areas of the chief deserts. The result is to place the Australian second among the great deserts of the world, with less than half the area of the Sahara, but occupying rather more than a third of the island continent. No part of this area is anything better than very poor pastoral country. The Mutooroo Station, near Broken Hill, is quoted as an indication of its possibilities. Here, with a rainfall of seven inches a year, an expenditure of £100,000 on waterworks has made it possible to maintain one sheep per twenty acres. What density of human population would this support?

In summarizing the study of climatic influences, Prof. Taylor has drawn a map (Fig. 14) showing the habitability of Australia, assuming that the desert can maintain less than one person per square mile, and that, apart from temporary mining towns, dense populations will be confined to areas which have a reliable rainfall of not less than twenty inches per annum and an average wet-bulb temperature below 65° F. for at least half the year. Measurement on this diagram indicates that only one-eighth of all Australia (excluding Tasmania) is capable of supporting a moderately dense population; and that of this part seven-eighths is in a coastal belt, nowhere more than 250 miles wide, extending round the south-east from Eyre's Peninsula, South Australia, to Cooktown, Queensland, while the rest is an isolated patch in the extreme south-west, from a little north of Perth to Albany. We should of course remember that an eighth of Australia is three times the area of the British Isles. One of the author's conclusions is that efforts at development should be concentrated on these habitable areas, and that it will be well to "leave the desert to its loneliness."

Space does not allow more than a very brief reference to the sections in which Prof. Taylor expresses his very unorthodox views on race relationships and the "White Australia" policy. His grouping of races is based wholly on the cephalic index, and the implication, stated clearly in the description of Plate 7 on p. 480, that this index is a direct measure of "ethnic level"—an undefined term—is one that will be accepted by very few anthropologists. But this view is the basis of his conclusions here. In fact, racial differences are much too complex to be summed up by a single measurement, and there is no adequate basis for the assumption that the shape of the skull *per se* is a determining factor in intellectual capacity. Arising partly from his belief that the broad-headed Chinese are on a higher "ethnic level" than the long-headed British, and partly from better-based economic facts, Prof. Taylor appears to advocate a policy of allowing a carefully limited and controlled immigration of Chinese (p. 481). He does not here suggest, perhaps because of lack of space, how the control could be maintained. And it seems also probable that such a policy would immediately reduce the already too small flow of emigrants from Britain to Australia.

The paper contains so much matter, and touches on so many problems, that it is difficult to give a fair idea of its content in a brief review, and we have touched on barely half of it. It is emphatically one that the student of geography should read for himself for the sake of both method and content.*

C. B. FAWCETT.

* Three papers, in which Prof. Taylor has set forth at greater length the views which form the basis of this one, have appeared in the *Geographical Review*, New York, as under:

"The Settlement of Tropical Australia," August 1919, vol. 8, pp. 84–115; "The

REVIEWS

EUROPE

Story of the English Towns : Newcastle-on-Tyne.— Prof. F. J. C. Hearnshaw. London : Sheldon Press. 1924. 7¼ × 5, pp. 126. *Illustrations* 4*s. net.*

THE story of Newcastle falls naturally into three main sections : first, that due to its position and fate as the principal English military base in the Border during the centuries of Anglo-Scottish warfare ; second, that of its coal trade and the part it played in the industrial revolution ; and third, associated with the other two, that of its development into one of the greatest and most distinctive of our modern regional capitals. Newcastle is the bridge-head town of the Tyne estuary, accessible to sea-going vessels and almost equidistant, about 60 miles, from Berwick-on-Tweed by the coastal plain and the Cheviot Gate, and from Carlisle by the Tyne Gap ; and since these two routes, which converge here, are the only lowland ways between England and Scotland, Newcastle was inevitably of prime strategic importance in the wars with Scotland. This gives much of its history closer relations with that of Britain as a whole than is the case with the majority of the towns treated in this series. This section of the story of Newcastle is well told by Prof. Hearnshaw in the first three-quarters of this little volume. The other sections are scantily treated. The fascinating story of Tyneside in the industrial revolution, in which its part was such that Newcastle has been termed the "Florence of the Industrial Renascence," is briefly touched on, while almost the only mention of its importance as a regional capital refers only to its comparative remoteness from London as a factor in its distinctive individuality. But we must not expect too much from a single historian, even one of Prof. Hearnshaw's amazing industry ; he has given us a clear and illuminating survey of mediæval Newcastle in its corporate life and its place in British history. Let us hope that some equally capable student of economic history will give us the natural sequel in a study of the rise of the modern city and its extensions on Tyneside. C. B. F.

The Scottish Mountaineering Club Guide, vol. 3, July 1923. Section A : **Island of Skye.—** Edited by **E. W. Steeple, G. Barlow,** and **H. Macrobert.**

The publication of a further section of this admirable work can only confirm the impression formed from earlier sections, that in it we are presented with one of the most perfect types of Guide-book of its class hitherto published. The fact that it is largely the result of personal exploration and observation on the part of the greatest authorities on the subject in itself ensures that distinction. The accounts of the many different routes described, with almost innumerable variations, are marked by a combination of clearness and terseness with an entire absence of the sensational embroidery that disfigures the writing of some enthusiasts on rock climbing.

For the active climber the descriptions are not only adequate for his purpose, but they are classified with care and discrimination to meet all reasonable tastes from "Easy," through "Moderate" and "Difficult" to "Severe . . . suitable for expert climbers only."

The varied and characteristic features of the Cuillin hills are described

Evolution and Distribution of Race, Culture and Language," January 1921, vol. 11, pp. 54–119; "The Distribution of Future White Settlement," July 1922, vol. 12, pp. 375–402.

by men whose love for them amounted almost to a passion, though a passion tempered with reason and an admirable sense of proportion. The late William Brown, a well-known S.M.C. member, reminds us that "The summits are of naked rock, blue-black or purple in colour, while the corries contain the *débris* torn off from the peaks above and tossed into a state of inconceivable chaos. On account of their chain-like formation, the Cuillin have always lent themselves to the form of climbing known as 'ridge wandering,' which can be enjoyed here as nowhere else in Scotland." Those familiar with the central main ridge of the Northern Japanese Alpine range, stretching from Hodaka northwards for 50 miles, will see these features of the hills of Skye reproduced on a scale over three times the size and offering the same fascination to the mountain wanderer.* Several of the excellent photographs in this volume would, so far as form is concerned, almost serve to illustrate either range, except that the richness of the tree-clad lower slopes of the Japanese chain is entirely absent from the bare Scottish hills. A masterpiece of description is furnished by the delightful and poetic appreciation of the Cuillin by Prof. Norman Collie, the high priest of their cult and the greatest authority on their value to the climbing brotherhood. But he can praise them in a way few such ardent mountaineers are sane enough to do, in that he acknowledges that, "spendid though the climbing on the Cuillin may be, it is only one of the attractions, possibly a minor attraction, to these hills. . . . Their individuality is not seen in their summits, . . . but in the colour of the rocks, the atmospheric effects, the relative largeness and harmony of the details compared with the actual size of the mountains, and most of all the mountain mystery that wraps them round."

A suggestive disquisition on the nomenclature of the word "Cuillin" is given by Mr. Collin B. Phillip, and should not be overlooked. Probably in a future era the inquiring investigator will trace with every confidence some connection between its name and that of the late President of the Alpine Club, whose presence will always be felt to be wandering amidst those mysteries the spell of which he has done so much to help others to appreciate.

Dr. Harker, though he disclaims the title of a climber, contributes a most valuable article—a revised reprint of one which had already appeared in the *S.M.C. Journal* (vol. 6)—on the Geology of Skye. This is a model of what such things should be, both in its lucidity when dealing with the rock formations and in the application of a knowledge of these facts to the purposes of the climber himself.

It will be a surprise to many to learn that during the course of a single summer holiday at Sligachan and Glen Brittle, Mr. James C. Thomson noted no fewer than seventy different kinds of birds, ranging from the linnet to the golden eagle.

Frank admissions as to the character of Skye weather conditions, sympathetic counsel touching the value of a fishing-rod (though by no means as an aid to climbing!), and also the somewhat depressing warning of the late Alexander Smith, that the scenery of Glen Sligachan is such as to "drive you in on yourself. . . . You hardly care to speak lest you be overheard. You cannot laugh: you would not crack a joke for the world"—these delightfully human touches are characteristic of the spirit of candour that is wholly sure of its subject. Lastly, a word of praise must be given to the excellent photographs, which supplement and illustrate the text and do not merely ornament the book. W. W.

* Cp. 'The Black Cuillin,' p. A, 14, or 'Sgurr nan Gillean,' pp. 50, 52.

ASIA

By Camel and Car to the Peacock Throne.— E. Alexander Powell. London: John Long, Ltd. 1923. 8½ × 5½, pp. xxii. + 392. *Map and Illustrations.* 15*s. net.*

This is mainly a brightly written account of a journey *viâ* Syria, Palestine, and 'Iraq to Tehran, with a return route from Baghdad by way of Mosul and Aleppo. The various phases of the journey are illustrated by some eighty-one excellent "snapshots." The author had with him two congenial companions and an ex-soldier Irishman "equally handy with a pressing iron, a frying-pan, and a gun."

The party were hospitably entertained by General Gouraud at Beirut, and after a superficial glance at Palestine started across the Syrian desert from Damascus. The latter part of this journey performed upon camels is vividly described, especially a severe sandstorm which overtook the party. The author gives details of outfit for such a journey, which should prove useful to travellers.

From Baghdad a dash was made by car into Persia, where the famous "Peacock Throne" was visited and photographed. The great room in which it was stored was a museum "crowded with the most amazing collection of junk I have ever seen gathered under one roof"—things of priceless value lying side by side with "knives, forks, combs, umbrellas, canes," "a wash-bowl and pitcher made of postage stamps," "stuffed birds of Paradise rather moth-eaten," "mechanical toys of every kind," "clocks of every kind, model, and material," etc. "Amid all this, at the far end of the room, hidden away in a recess so dimly lighted that it is scarcely visible, is the most beautiful object in all Persia—the world-famous Takhte Tavoos—the Peacock Throne." "An exquisite example of Oriental workmanship, an object of surpassing beauty," such are the terms used by the author to express his admiration, though some will possibly be disposed to rate its claims less highly.

The journey is described in a racy way throughout, and there was no inconsiderable share of adventures; but the writer seems to have had a purpose in it all. There are stringent criticisms on the political outlook—on the French in Syria, on the Zionist policy in Palestine, on the British policy and so-called "treachery" in 'Iraq, especially in our setting up Faisul as King. Most trenchant of all are the author's remarks regarding the British treatment of Persia in connection with oil. These criticisms do not fail in directness, and coming from a detached American observer (who blames his own country for cutting adrift from the Near East after the war) they cannot be ignored. It may be as well at times for us to see ourselves as others see us. This is not the place to enter upon a political discussion, but those interested in the Near East will do well to recognize a point of view which may prevent too much national self-complacency. E. W. G. M.

A Springtime in Palestine.— Myriam Harry. London: Ernest Benn, Ltd. 1924. 9½ × 6, pp. 206. *Illustrations.* 15*s. net.*

Madame Harry visited Palestine with considerable reluctance, but the impressions of a short sojourn made her eager to return at the first opportunity. Her enthusiasm for the Zionist work is evident upon every page of her book, the narrative of a journey from Damascus to Jerusalem. Her account of the work being done in Palestine by the Jewish Legion and the Friends of Zion is certainly inspiriting. The life of the members of the co-operative colonies drawn from all countries of the world, with its daily round of farming, road-

making, or afforestation, is painted in almost idyllic hues. The writer recognizes the existence of considerable criticism of the movement, but beyond refusing to identify Zionism with Bolshevism, and maintaining that the Zionists have no quarrel with the settled Arabs, she displays one side of the picture alone. Her description of Jerusalem during the Easter celebrations is to some extent an unconscious commentary upon her general optimistic views. In so far as the educational side of the movement is concerned, upon the success of which the attempt to blend the various strains must in turn depend, her hopes would seem to be justified.

Die Feldfrüchte Indiens, in ihrer geographischen Verbreitung.— Dr. Th. H. Engelbrecht. Hamburg: Friederichsen & Co. 1914.

This book, by the author of the monumental work 'Die Landbauzonen der aussertropischen Länder,' brought out as far back as 1899 (see *Journal*, vol. 15, p. 52), is one of the publications of the Hamburg Colonial Institute, and seems to have been "hung up" by the war. It consists of an atlas containing twenty-three maps and a volume of text (pp. 271) in which nearly sixty pages are devoted to elaborate tables of the distribution of the various crops in every province and district. The treatment is indiscriminate and interminable. What is the good of recording in formal columns for thirty-five districts of Agra that there is no jute, no coffee, no cinchona, etc.? Nor is the basis of classification really useful, or even sound, however ingenious. It is obviously helpful to know what percentage of total area any crop covers, especially if this is related to relief and climate and mapped geographically. It may be useful to know what percentage of total crop values any one crop has, as weight and worth are very different things. But we question the value of mapping, or even knowing, the distribution of, *e.g.*, tobacco or coffee in a percentage of the cereals of the same district.

The same sort of irrelevance is found in the atlas. The maps are clearly printed, and the distributions seem to be quite sound and up to date for 1914, but the choice of additional and explanatory matter is simply bewildering, mainly because of the futile basis of classification. For instance, in Map 1, *part* of the cotton area of the Deccan is labelled "Cotton," but the rest is labelled either "Wheat" or "Sorghum." On Map 2, "Wheat," the January 1-in. isohyet, which is really important, is given; but the *only* isotherm is 26° C., which is valueless except as possibly marking accidentally the southern limit of wheat. On Map 3, "Barley," there is no isotherm at all, and only one isohyet, 5 in. for September, which does not cross any one of the chief barley areas. The same sort of thing occurs throughout, sometimes even worse. For instance, on Map 14, "Linseed," there is no isohyet and only one isotherm, 24° C. for January, which does not anywhere cross any area with a linseed percentage of over five! On Map 15, "Rape," the one isotherm, 21° C. for January, does not cross even a three-per-cent. area. The "Cotton" and "Jute" maps, 21 and 22, are more useful: the limit of winter cotton, *c.* 18° N., is given, and the May rainfall on the Ganges delta, where the 10-in. isohyet coincides remarkably with all the best jute land. But most of the information on both maps is curiously irrelevant; for instance, east of the Hooghly and south of the tropic, the rainfall is relatively unimportant to jute, and the 50-in. isohyet in Burma has practically nothing whatever to do with cotton.

These defects mar the usefulness of a work on which a large amount of painstaking industry must evidently have been expended, and which after all presents a considerable amount of information not easily got at elsewhere.

L. W. L.

Siam.— W. A. Graham. London: Alexander Moring. 1924. Two volumes. 8 × 5½, pp. xii. + 396 and 320. 153 *Illustrations and a Map.* 42*s. net.*

This book was originally published in 1912 as one volume, entitled 'Siam: a Handbook of Practical, Commercial, and Political Information.' During the last decade many changes have taken place in Siam, and to keep pace with these Mr. Graham has brought his work up to date, at the same time expanding it considerably. It is now far more than a handbook, and may well rank as the standard work on Siam, for it is comprehensive, accurate, and logically arranged. The first volume begins with an admirable chapter on the geography, and goes on to deal with the races of Siam, history, social organization, and administration, and also has a valuable guide to the bibliography of the country. In the second volume Mr. Graham gives a description of the industries, of which agriculture, fisheries, forestry, mining and rice-milling are the most important; discusses the growing commerce and trade of Siam, and its communities; while chapters on art, archæology, architecture, music, and religion conclude a work which it is not too much to call a model of its kind. It is, of course, purely a utilitarian book of facts, and is not always easy reading, but the numerous and admirable photographs add an interest to the text. There is an index at the end of each volume, and some useful appendices give lists of indigenous animals, plants, and minerals, as well as trade statistics and currency tables.

The only fault to be found with the book is the inadequacy of its map. It seems deplorable that so valuable and exhaustive a work should be published with a map that has no lines of longitude or latitude, and shows not a single hill. Owing to costs of production, publishers are parsimonious nowadays in the matter of maps, but when a work is produced at the high price of two guineas, it is not unreasonable to feel that its value might have been enhanced by a good map in colour, on which the reader might look for every name mentioned in the text without being disappointed. O. R.

Chinese Lanterns.— Grace Thompson Seton. London: John Lane. 1924. 9 × 6, pp. xv. + 373. *Illustrations.* 12*s.* 6*d. net.*

The news that "an Emperor without an empire was to wed, at dawn, in the Forbidden City of Peking, a bride whom he had never seen" stimulated Mrs. Seton's imagination one morning in 1922, and eight hours later she was speeding to Shanghai. By dint of perseverance and successful wire-pulling she was enabled to realize her ambition of seeing the wedding of the Boy Emperor of China, and the first part of her book describes the various ceremonies connected with what she calls "the most brilliant and elaborate, strange and charming, pageant that the Oriental mind has built up through the ages."

While in Peking she was successful in obtaining an interview—the first given to a foreign woman—with Li Yuan-Hung, then President of the Republic, and obtained from him a message to the American public. Travelling south, she spent five days in Canton during the revolution in January 1923, and she has much of interest to say concerning political conditions in China, of which she obtained first-hand information. She deals at considerable length with the present position of the various classes of women in China, and although she cannot write from long and intimate experience of Chinese life as Lady Hosie has done recently in her book, 'Two Gentlemen of China,' she brings a quick and inquiring mind to bear on social problems the panacea for which, as the President declared, is universal education.

O. R.

AFRICA

With my Wife across Africa by Canoe and Caravan.— Colonel J. C. B. Statham. London: Simpkin, Marshall & Co. [1924.] 9 × 5¾, pp. 322. *Sketch-maps and Illustrations.* 12*s.* 6*d. net.*

Colonel and Mrs. Statham crossed Africa from west to east. The first half of the journey, from Mossamedes (Southern Angola) to the Zambezi above the Victoria Falls, was through a country imperfectly known. It was indeed partly because it was so remote from all beaten tracts that it was chosen. Colonel Statham already had a wide acquaintance with Africa, and in carrying out his wife's idea of a wedding trip in the African wilds he naturally sought something novel. The route also offered the possibility of making great part of the journey, that from the Kubango river to the Zambezi, by canoe. As an old campaigner Colonel Statham took care to provide for all likely contingencies, the more so as his wife was with him. Risks are inevitable on such a journey, and Mrs. Statham was quite prepared to, and did, face them with cheery courage and optimism, backed by a strong constitution and staying power.

The chief incidents of the expedition—made in 1922, though this does not appear to be directly stated—were described by Colonel Statham at a meeting of the Society last session (see the *Journal* for January 1924), and need not here be repeated, but the book should be read by all interested in African travel, and by the larger class—including schoolboys—who love a tale of adventure. Colonel Statham tells his story well; there is a freshness and directness about his narrative which all his readers will appreciate. In the course of the journey he had more than one narrow escape from death, as, *e.g.*, when rescuing his dog from the attack of a wounded antelope; but of the many dangers met and overcome, the greatest was not from savage beast or relentless Nature, but from a white man; a lone poacher hunter who lived on the Angola-Rhodesia border and whose mind was unhinged. A two hours' midnight parley with an armed madman, with his wife in the tent behind, listening in dread and terror to all that passed—that was the worst of Colonel Statham's experiences. The story of this madman and that of another outcast, a Greek, are among the most thrilling incidents given.

'Across Africa' will make its strongest appeal, perhaps, to the naturalist. Colonel Statham is a recognized authority on the game of Africa, and in an appendix he deals particularly with the animals and birds he found. Other appendices concern the people, the land and the flora of Southern Angola and the Northern Kalahari. Colonel Statham's summary of the river systems is very clear, though a better map is desirable. The disappearance of Ngami and of the Makarikari lake is not the only evidence of increasing desiccation. The miserable ending of such a magnificent river as the Kubango (Okavango) seems a tragedy of Nature. By his own investigations and the marshalling of the evidence of earlier travellers the author has done good work in respect to the problem of water supply, which is a matter of vital importance to the future of South Africa. F. R. C.

Ashanti.— Captain R. S. Rattray. Oxford: Clarendon Press. 1923. 9½ × 6, pp. 348. *Sketch-map and Illustrations.* 25*s. net.*

Captain Rattray and his colleagues, the official anthropologists of Colonial Administrations, are the founders of a new science, which for want of a better term may be called Applied Anthropology. In collecting data among peoples who by contact with Western civilization are in danger of losing their ancient

characteristics, these scientists have on more than one occasion materially assisted the local administrations to rule more justly and avoid the errors which are born of ignorance. Ignorance surrounding the question of the Golden Stool was the cause of the second Ashanti war, and might easily have led to a third campaign in 1921–2 had it not been for Captain Rattray's explanations that this object was no emblem of authority falling by right of conquest to His Majesty's Government, but the "shrine of the soul of Ashanti." The consequence of these representations was that the demand for its surrender was dropped, and the hostility of the Ashanti people gave place to a feeling of gratitude. In the complex questions of land tenure the author has done equally good practical service by his investigations. So far from being an extravagance, the official anthropologist is an economy to any government, and the Gold Coast administration is to be congratulated upon its choice. The present book is not the first of the series dealing with the Gold Coast; most of it concerns religious practices and beliefs, and includes a detailed examination on the Ashanti drum language. As befits a work on modern anthropology, it is written objectively, so much so that it is often hard to ascertain the author's own views. One would have been glad to learn more of what he thinks of the origin of the Ashanti people and their customs. One thing Captain Rattray has sought to establish and has done so convincingly, namely, the existence of a belief in the Supreme Deity which has not been learnt from the teaching of the missionaries. The latter have been too apt to dismiss the religious beliefs of the Ashanti people as nothing better than "fetishism," for which there is no more justification than there would have been in describing Socrates and his followers as "fetishists."

A man who can approach a strange race in all sympathy, and study their beliefs without offending, is worthy of praise, but when he does so in the reverent spirit in which Captain Rattray has approached the subject it is clear that we are dealing with something remarkable. The best testimonial for his methods is contained in a paragraph quoted from his introduction to the papers on the religion of Ashanti (p. 89):—"I made it clear to them," he writes, "that I asked access to their religious rites such as are here described for this reason," namely that he was seeker after truth, and not inspired with mere idle curiosity. "I attended these ceremonies with all the reverence and respect I could accord to something which I felt to have been already very old, before the religion of my country had been born as a new thought." Captain Rattray is a missionary in the truest sense, who can honestly say that in the course of his work, which has been consistently devoted to Ashanti, he has learnt as much as he has taught, and has taken only as much as he has given.

F. R.

The Road to Timbuktu.— Lady Dorothy Mills. London: Duckworth. 1924. *Sketch-map and Illustrations.* 15*s. net.*

It is difficult to know what to say of a book that had far better have never been written, and yet express that appreciation which in a certain measure it deserves. This is a popular book of travel in an area which, for Africa, is comparatively well known scientifically. Nevertheless much of the information which Lady Dorothy Mills has culled from a superficial perusal of authorities that she has not properly understood is inaccurate. The book is therefore misleading for the general reader, nor is it very easy to read. The author misuses French and native terms, and with them interlards *ad nauseam* phrases which have no right to a place in the English language. Towns need not always surely be referred to as "she," and words like "Moslemism" and

"Cocoa-palm" simply must not occur. The French spelling of names like "Oulof" for "Wolof," or "Peuhls" for "Fulani" or "Fellata" adds to the unpleasantness of sentences beginning "Unlike in Timbuktu. . . ." The Berber queen, Kahena, of the Aures mountains, who fought the Arabs in Tunisia was *not* a "Touareg Chieftainess," and the wholly inconsequent information about the Mediterranean coastlands which is dragged irrelevantly into a chapter on the Roads to Timbuktu is mainly superficial or incorrect. A chapter that is not very pertinent dealing with the future of the Negro races is perhaps the best one in the book, though some of the folk-lore stories are good; they would be valuable if one could discover to which particular section of the many people described they refer. The description of the "Touaregs" (already a plural form without an additional *s*) is also quite good, if rather highly coloured and ethnologically hazardous.

There are many other faults, but the reader should forgive them for the sake of the real love of Africa which the author has, and to which she is trying to give expression. One is inclined to say to her, "When next you go, as go you will, be reticent when you return, or else seek another lover of Africa to help you paint her picture, that you may not again offend the spirit of that land." If she does this, she will not need to write a disingenuous preface intended to disarm the critic, and we hope she will not fall ill again in distant parts. F. R.

AUSTRALASIA AND OCEANIA

Geomorphology of New Zealand. Part I. Systematic: an introduction to the Study of Land-forms.— **C. A. Cotton, D.Sc.** (New Zealand Board of Science and Art, Manual No. 3.) Wellington, N.Z.: Dominion Museum. 1922. $8\frac{1}{2} \times 5\frac{1}{2}$, pp. x. + 462. *Diagrams and Illustrations.* 22*s.* 6*d.*

The 447 pages of text are divided into twenty-nine chapters covering the various types of land-forms and the processes of their evolution: Introductory (two chapters); Normal Eroding Agents and their Work (two chapters); the Normal Cycle (six chapters); Fossil Plains and Superposed Streams, Land-forms associated with Faults (two chapters); Block Mountains and Related Features in New Zealand; Land-forms built of Waste in the Course of the Normal Cycle, Complications in the Normal Cycle due to the occurrence of Regional Movements, Composite Topography and River Terraces, Interruption of the Normal Cycle by Differential Movement, Aridity and the Work of Wind, Glaciers and Glaciation (four chapters); Volcanoes and Igneous Action (two chapters); Marine Erosion, Coastal Profiles and Coastal Outlines and the Shore-lines of Lakes (four chapters).

It is the hope of the author to popularize in New Zealand the "fascinating study of land-forms," not only by helping to an appreciation of geomorphological articles in scientific journals, but also by inducing readers and students to "undertake for themselves with some degree of confidence the interpretation of the landscapes they see about them." Acknowledgment is made above all "to that great teacher Prof. W. M. Davis of Harvard University." The mention of the name of Prof. Davis will tell the initiated much about the systematic and reasoned method of treatment to be expected, and he will not be disappointed. Few, if any, countries in the world contain such variety of form in so small an area, and we heartily congratulate Prof. Cotton on making full use of his opportunity. We sincerely hope that the book will have many close readers, not only in New Zealand but in all English-

speaking countries. If attractiveness of matter, clearness of arrangement and expression, excellence of print and paper, and generosity of illustration can accomplish anything, the hopes of the author should be realized. When it is said that there are 442 apt block diagrams, maps, and photographic reproductions in 447 pages, it will be evident that no pains have been spared to make the text as vivid and instructive as possible; and the book is completed by a bibliography covering five pages and a full index. The one drawback is the high price, and we feel we must express a great desire that some means may be found for reducing its cost to teachers and students, so that it may find a place on the geographical book-shelves of as many as possible.

Part II. of 'Geomorphology of New Zealand' is promised. This regional treatment of the surface of New Zealand is stated to be "in preparation for publication." In Part I. we missed any reference to the interaction of landform and life, especially human life, in New Zealand. To the geographer it would add greatly to the interest and value of the book, but perhaps such references are reserved for Part II., to which we shall eagerly look forward.

C. C. C.

HUMAN AND HISTORICAL GEOGRAPHY

Economic Geography.— Prof. R. H. Whitbeck and **Associate Prof. V. C. Finch.** New York: The Crow-Hill Book Company. 1924. $9\frac{1}{2} \times 6$, pp. i.–xii. + 1–588. *Illustrations.*

This is a production typical of the United States, but is perhaps the best of its kind. The body of knowledge is most useful, and the attitude of mind is scientific and thoroughly geographical—a causal study of human adjustment to environment, looked at from the point of view of both products *qua* products and regions *qua* regions: no physiographic or climatic material, as such, is introduced directly, but both are assumed throughout. The products are treated as they occur "naturally," and, as the mass of the book is concerned with the United States, most of them are treated in the chapters devoted to that unit; such as are not found there, *e.g.* raw silk and rubber, tea and coffee, are treated in connection with the chief countries of origin.

We do not like this method, for the particular products may occur, and do occur, in many countries where, though very important to the local producers, they form a tiny percentage of the world output; and so they are ignored or slurred over, certainly are not properly understood, until we reach a producing area of world importance. For instance, we have to wait for any detailed treatment of silk till we reach p. 481; and even then the treatment is exceptionally weak.

The book is very typical in its exaggeration of the importance of the United States. The whole of Part I. (pp. 263) is devoted to "the United States and Canada"; but, of this, only about ten pages are given to an effective study of Canada, even the "fur" section being more than five times as long in the U.S. chapter as in the Canadian. Similar proportions are observed for other products, *e.g.* fish and timber. The result is that, while the book gives the best account of the economic geography of the States with which we are acquainted, it is poor—in quantity, not quality—for all outside regions. The "summaries" for the rest of America are adequate, and the emphasis is almost always on the right points; but in the rest of the book the only really satisfactory chapter is the "Introduction" to Europe, where many points are rightly emphasized which we are apt to leave unnoticed as being "obvious." The rest of Europe is so greatly over-compressed as to be mere "pemmican," and we object strongly to a distribution being described on a map as "racial"

when its basis is languages. The treatment of all the rest of the world outside Europe is little more than nominal.

The excellence of the United States chapters is not confined to the body of knowledge and the general attitude of mind; the whole style of treatment is excellent, based on a sound and broad creed that is explained in an introductory chapter. There are admirable instances of modern geographical criticism, *e.g.* that there is more land in the States needing drainage than irrigation, or that inland water-transport except in special cases (of which England is *not* one) cannot attempt to compete with rail. And it is typical of a book produced in the States that it is full of good illustrations from *Government* sources, especially the Department of Agriculture. They are mainly without dates and without any definite statement of their time-basis, which is a pity; but they do not leave any impression of doubt or inaccuracy, only of regret at not having the actual dated facts of which they make an admirable presentation. Where statistics—instead of diagrams—are given, they are quite up-to-date, some even being to the end of 1923. L. W. L.

GENERAL

The Citizen's Atlas of the World.— John Bartholomew, M.A. 4th edition. Edinburgh: J. Bartholomew & Son, Ltd. 1924. 14½ × 10, pp. xi. + 192 + 212. *Art Canvas, £2 5s. net.*

This new edition of a well-known and useful political atlas has been revised to show post-war boundaries, and is especially useful in its representation of the still unfamiliar divisions of Soviet Russia-in-Asia. But no attempt has been made to divide the mandated territories of Palestine and 'Iraq from the independent kingdoms and Emirates of Arabia, and this is rather seriously misleading. The special interest of the new edition lies in its treatment of place-names.

It must necessarily be many years before we can hope to find in atlases anything like all the national spellings of place-names in the new countries of Europe. But already we have a right to expect the more important towns to be given their "new" names; and a very fair attempt at achieving this object has been made in the Citizen's Atlas, in which it is obvious that the lists of place-names issued by the Permanent Committee on Geographical Names have been largely consulted. In the map of Poland, for instance, all the names are given in Polish, with the diacritical marks carefully inserted. Where the P.C.G.N. has retained conventional forms such as Warsaw and Brest-Litovsk, the Atlas gives the national spelling first and adds the conventional in brackets—Warszawa (Warsaw), Brześć-Litewski (Brest-Litovsk). The same remarks apply to the map of Czechoslovakia; but here we find that many of the smaller places retain their German and Magyar names, *e.g.* Oderberg [P.C.G.N. Bohumín], Zips and Szepes [P.C.G.N. Spiš], and especially rivers and mountains—Moldau, Waag, Weisse Karpathen, Ost Beskiden.

In the map of Yugoslavia, on the other hand, we find the Dalmatian names in Italian (as adopted by the P.C.G.N.) with the Yugoslav in brackets; and there seems to be some confusion of principle in giving Skoplye (Uskub) and Ishtip (Shtip), where the Yugoslav names are Skoplje (pronounced Skoplye), Štip (pronounced Shtip) and the Turkish Üsküb, Ishtib respectively. Th Magyar Zimony, not the Yugoslav Zemun, is added in brackets to the conventional (German) Semlin; and we are sorry to see the German Belgrad preferred to the conventional English Belgrade. Similarly in România, Bukarest, and not Bucharest, is added in brackets to București. Most of the

Românian spellings are given correctly, though in this map the diacritical marks are often omitted, notably in the name of România itself, which, by the way, appears in some sheets as Rumania. Bulgarian names are in rather a chaotic condition, being mostly transliterated into the Serbo-Croatian "latinica" system, and not always correctly at that—Vraca should be Vratca, and Sumen should be Šumen. Keustendil and Jamboli are nondescript transliterations of Turkish, while Agathopolis (Akhtebol) is Greek with Turkish in brackets.

If the map of Russia is compared with the same sheet in the International Reference Atlas, a good many improvements in spelling may be noted; but there is room for many more. Old-fashioned forms like Vytchegda, Verkoturie, Bachmut still persist, while the Vishni Volotchok and Veliki Ustyuk of the I.R.A. have scarcely been improved as Vyshniy Volochok and Veliky Ustyug, the termination of the Russian adjective (-iŭ) being precisely the same in both these cases as in Nijni (Novgorod).

In the map of the Baltic States and Finland the names are mostly in their national forms; but beside Tallinn (Revel), Dangavpils (Dvinsk), etc., we find Libau, with the Lettish Liepaja ignored. The spelling Esthonia has been preferred to the P.C.G.N.'s Estonia.

For the Asiatic sheets, the P.C.G.N.'s second Asiatic List was evidently not available at the time of publication. The 'Iraq List has been used as far as it goes, but names not occurring in it have not been brought into line with its spellings; *e.g.* we find Qal'a Sharqat, Qasr al Khubbaz, but Kala and Kasr elsewhere. Kuhzistan is a misprint for Khuzistan.

In the spelling of African names, the P.C.G.N.'s First African and Tanganyika Territory Lists have been followed. But in Oceania many names have not been corrected to agree with the P.C.G.N. List.

It is satisfactory to find the work of the P.C.G.N. beginning to bear fruit; but if we are to avoid the complaints of the new nationalities that out-of-date names are still found in British publications, it is evident that the Committee, who have in their General Lists hitherto endeavoured to concentrate on names of first importance, will have to extend their labours to cover the vast number of names in small print which appear in atlases and larger-scale maps.

The atlas is well printed on good paper, and there is a full index.

J. H. R.

THE MONTHLY RECORD

EUROPE

General Wade and his Military Roads in the Highlands.

AN article under the above title is contributed by Mr. J. Mathieson to the *Scottish Geographical Magazine*, July 1924. We had previously noted (*Geo. Journ.*, **61**, 385) the acquisition by the Royal Scottish Geographical Society of a comprehensive collection of plans and MS. maps bearing on General Wade's career as a road builder. The work, undertaken mainly with the object of holding down the Highlands, was started in 1725, and six roads, covering 245 miles in all, were built under the general's supervision. The four main routes were: (1) Fort William–Fort Augustus–Inverness, 61 miles; (2) Dunkeld–Inverness, 101 miles; (3) Crieff–Dalnacardoch, 44 miles; and (4) Dalwhinnie–Fort Augustus, 31 miles. The roads were built by soldiers

in a series of straight lines after the Roman fashion, and were generally 16 feet in width. Forty bridges were also built in Wade's time. The route of the Fort Augustus–Inverness road along Loch Ness was entirely new, being blasted out of the face of the rock. In several instances the present roads diverge considerably from Wade's in order to avoid steep gradients or quagmires, and new bridges have also been built at many points. A considerable portion of the Crieff–Dalnacardoch road is now unused, and the whole of the Dalwhinnie–Fort Augustus section has been abandoned, and is now entirely obliterated in parts. Besides these roads, Wade had planned others, including one from Ruthven to Braemar on Deeside, which, if built, would traverse some of Scotland's finest scenery. The cost of Wade's roads is estimated at £22,730. Though primarily built for military purposes, and consequently unpopular with the Highlanders, these roads soon carried a good deal of traffic. Though Wade retired in 1740, his work was continued, and received a further stimulus from the rebellion of '45. By 1790, 1100 miles of military roads had been built. Other roads in Scotland were built by local labour, under a statute of 1669, by landowners at their own expense, and by the commissioners appointed in 1804 to administer the Road and Bridge Act. The latter took over the military roads in 1814, allowing those of no economic value to fall into disrepair.

Doubts as to the Value of Afforestation in S.E. France.

M. F. Lenoble continues his attack upon the popular view of the value of afforestation in an article, "La valeur économique de la reboisement des Alpes méridionales," contributed to the *Revue de Géographie alpine*, Tome 12, fasc. 1, 1924. He makes it clear that his criticism of this policy applies only to the "dry Alpine" regions of the Drôme and the Durance. Here, he maintains, the expenditure upon afforestation has produced no commensurate result, either in the amelioration of the climate, the prevention of erosion and inundations, or the increase of the economic value of the region. His case is strongest on the economic side. He argues, for instance, that heavily wooded regions are not necessarily areas of heavy rainfall, and cites the case of Ireland as an example of the contrary. From figures obtained from Avignonet, on the Drac, he calculates that it would take 5000 years to remove soil to the depth of one metre from the river-basin. As for the havoc caused by the flooding of mountain torrents, he considers that, judging from the amount of compensation paid, the average annual damage for each torrent amounts merely to several hundred francs. In no direction are the results worth the heavy Government expenditure on the planting and upkeep of forests, but if it stimulated the economic life of the region it would still be remunerative. This however is not the case. Owing to the aridity of the soil and the dryness of the climate, the timber produced is practically valueless, and owing to knots and to resin, is not suitable for pulping for paper. Added to this, the high transport charges, due to distance from railways and the character of the roads, make the exploitation of the timber profitless, even where it has been purchased standing for an almost nominal sum. In the dry alpine area of Haut-Diois, the profit per hectare per annum is as low as 0·21 franc, compared with a profit of 40 francs per hectare per annum obtainable in the "humid alpine" area of Valence. Altogether, M. Lenoble thinks that five-sixths of the forests of the southern Alps are unexploitable. Instead of the expenditure of large sums on afforestation with little or no return, he advocates the development of that industry for which these mountain slopes are most suited—the production of wool

and mutton; and if oaks were planted in place of pines, supplies of forage would be increased. Lavender-growing, with a little attention, could also be developed profitably.

ASIA

The Japanese Earthquake of 1 September 1923.

A preliminary report by Prof. A. Imamura, the first issued by the Imperial Earthquake Investigation Committee, has been published in the *Seismological Notes* of that Committee (No. 6, 1924). Most of the instruments in the Seismological Institute at Tokyo were wrecked or dismantled by the first shock. Of the whole number, only one component of one seismograph registered the movement from beginning to end, an interval of two hours twenty minutes, but within ten minutes from the first vibrations four seismographs were sufficiently repaired to continue their useful work, and others were added in the following days. Though few recorded more than the first tremors, these happened to be the most important, for, from the direction of the earliest vibrations and the duration of the preliminary tremors, the position of the epicentre was found to be in lat. 34° 58′·6 N., long. 139° 21′·8 E., or under Sagami Bay, and the depth of the focus to be roughly 15 kms. The survey of Sagami Bay, repeated by the Imperial Hydrographic Service, showed that an area of 700 sq. kms. had been depressed on an average by 39 fathoms, and another area of 240 sq. kms. raised on an average by 45½ fathoms (see *Geographical Journal*, vol. 63, 1924, pp. 241–243). These movements naturally gave rise to sea-waves, which along the shores of Sagami Bay reached heights of 8, 9, and even 12 metres, and the remarkable feature of these waves was that the directions in which they advanced showed that the largest waves came from the areas of elevation, while those that came from the areas of subsidence were comparatively small. The great earthquake came without any warning fore-shocks, though four very slight shocks were registered at Tokyo during the preceding month, all of which had origins within or near Sagami Bay. The after-shocks, as usual, were very numerous, partly on account of the large focal area, partly because the first shock was followed in less than fifteen hours by another almost equally severe in a different part of the same seismic zone. During the first month, the total number recorded at Tokyo was 1256, of which most of the strongest took place in the Sagami Bay area, though others originated within and to the south-east of the Bo-so peninsula, and also in a district to the north of Tokyo.

Climatology of Central Asia.

Whilst a prisoner of war in Russia Dr. Heinrich Ficker, of Berlin, occupied himself with discussing a mass of climatological statistics for a large tract of Central Asia from southern Siberia to the confines of India, and from the Caucasus to the coast of China. The results are contributed to the *Geografiska Annaler* (1923, No. 4) in a paper entitled "Untersuchungen über Temperaturverteilung, Bewölkung und Niederschlag im einigen Gebieten des mitleren Asiens," which adds considerably to our knowledge of the subject. The period covered by the observations, namely the decade 1894–1903, is not perhaps long enough to be truly representative of the detailed distribution of temperature, rainfall, and cloudiness, but permits a good approximation, and its main features are quite concordant with the isotherms shown in Rykachev's climatological atlas of Russia for the half-century 1849–1900. The chief interest of the paper lies in the regional and seasonal anomalies disclosed and interpreted. In January, and in winter generally, the plains of both Eastern

and Western Turkestan are unduly cold, whilst the vicinity of the mountain ranges focussing in the Pamirs is relatively warm, a feature so pronounced that even the reduced annual isotherms are deflected northward over the mountainous tract. That this is no trick involved in the process of reducing the temperatures to sea-level, but a genuine example of the well-known winter inversion of temperature with height, is shown by the figures for stations fairly close together, some of the higher being not merely relatively but also actually warmer than the lower, although high-lying *basins* always produce their own cold through air drainage and radiation. Thus Lukchun, 17 metres below sea-level, has a mean January temperature of 14° F., whereas at Kashgar at 1220 metres it is no lower than 21° F. On the other hand, Pamirski Post, in a basin-shaped depression at an altitude of 3640 metres (about 12,000 feet), has a mean January temperature as low as − 2° F. Here in the extreme continental climate of Central Asia the winter inversion of temperature with height (which in the Alps, and still more the Grampians, is only an occasional phenomenon of frosty anticyclones) is in the Pamirs and Tian Shan a frequent condition, the surrounding lowlands being more intensely cold than moderate altitudes on the margins of the mountains.

The extreme rigour of the Pamirski Post illustrates the way in which the climatic effect of altitude *per se* is complicated by the effect of local configuration. The normal temperature of a single place, and certainly the conditions prevailing there at any one time, may be governed more by its local setting among mountains than by its height. But in striking averages of many places, or even of different conditions of weather in the same place, the influence of the configuration factor on normal thermometric distributions becomes entirely subordinate to that of altitude *per se*. The case is otherwise with rainfall, in which configuration is paramount.

The July isotherms of Central Asia indicate a fairly regular trend, but the intense summer heat in many parts is noteworthy. Thus Lukchun has a July mean of 90·3° F., and Kashgar, though some 4000 feet above sea-level, has a July mean of 81·5° F., or several degrees hotter than Rome in a similar latitude near sea-level. Central Asia is the only region in the world with a sufficient degree of continentality to permit April to be warmer than October. This area with a warm spring embraces the Kirghiz Steppe and Western Turkestan with April 2° or 3° F. in excess, and Eastern Turkestan and Mongolia where the excess is locally as much as 9° F. In the whole of this region the winter snowfall is light and disappears early, but the great excess of spring warmth in part of Eastern Turkestan is also due to a configuration peculiarly favourable to surface heating. The anomaly is shown to be due to abnormal warmth in April rather than undue cold in October. A measure of climatic continentality is assigned to the various regions dealt with on the basis of Zenker's method (Hann's 'Climatology,' English transl., p. 215), based like that of Spitaler on relative annual range of temperature (*Journal*, vol. 64, p. 43). The variability of temperature from one year to another, in keeping with the high grade of continentality, is generally large. Whereas on the south side of the Caucasus the difference between the coldest and warmest January in ten years was only 7·5° F., it was 15·8° F. in Eastern Siberia, and as much as 35·8° F. in Western Turkestan. The latter region is one in which the change of temperature with latitude is rapid, and it is easy to understand that places which lie amid crowded normal isotherms are particularly prone in individual years to be overlapped by warm or cold protrusions of air from south or north respectively. The point is of interest, because though Western Turkestan

shows a less degree of climatic continentality than Eastern Siberia according to Spitaler's method of annual range of temperature, yet if we were to measure the continentality by standard deviation of winter temperature from normal it would come out higher (see *Journal*, vol. 64, p. 52).

Dr. Ficker ends with the consideration of rainfall and cloudiness distributions which bear closely on many anomalies disclosed in the regional and seasonal distribution of the temperature.

AFRICA

The Inscribed Rock at Sierra Leone.

We have received a note from Mr. J. J. Kloppert of Rotterdam dealing with a point raised by the article published under the above title in the August *Journal*, pp. 139–41. Noticing that "admiralen" was the plural form, and that the name I. G. Meppel was closely associated with that of De Ruyter, Mr. Kloppert wrote to the *Nieuwe Rotterdamsche Courant* to inquire if anything were known of a vice-admiral of that name. Soon after Mr. M. G. Wildeboer wrote to say that a Dutch sailor named I. G. Meppel was promoted to the rank of vice-admiral in 1659, and given command of the second fleet despatched to the south under the chief command of De Ruyter. In 1661 he led a squadron against the Barbary pirates. He became "Lieutenant Admiral" of Northern Holland in 1665, and served with distinction under De Ruyter in the Anglo-Dutch war of 1665–7. His portrait by Pierson, his sword and other relics, are in the West Frisian Museum at Hoorn. There is also another portrait by J. A. Rootius in the State Museum at Amsterdam.

The Webi River of Somaliland.

One of the long-standing problems of African geography has been that of the actual termination of the river generally known as Webi, or Webi Shabeli, which presents the singular phenomenon of a river which arrives within 3 or 4 miles of the sea, after a course of perhaps 1000 miles, without ever entering it. A recent Italian expedition under Major V. Tedesco-Zammarano has at last carried out a careful examination of the lower course of the river, from the neighbourhood of Brava to a point not far from the mouth of the Jub, and in spite of climatic and other difficulties has practically solved the problem. The traveller describes in detail the results of his examination in the *Bollettino* of the Royal Italian Geographical Society, Nos. 3–4 and 5–6, 1924. He begins by summarizing the course of exploration of the river from the time of Cruttenden onwards, and the various views held as to its termination. That most generally current supposed the river to terminate in a region of large swamps, known as Balli, a little north of the equator after flowing some 200 miles parallel to the coast, along the inner side of the line of high consolidated dunes which bar its access to the sea. Other theories supposed a subterranean course either to the sea or to the Jub a little above its mouth. The recent expedition began its detailed work a little north of 1° N., but had previously examined the river inland from Brava, and it is in the conditions in this region rather than in those of the river's ultimate termination that the causes of its disappearance are held to lie. At no very remote period a bifurcation has taken place, one branch (the nearer to the line of dunes) having become virtually dead, while the other, owing to the slight slope of the ground, has raised the level of its bed by the deposition of sediment to such an extent as to spill more and more of its water over the lower ground forming the interior alluvial plain. South of the point of re-union of the two branches

the amount of water carried is thus greatly reduced. A continuous and generally well-defined course could however be traced, with a consistent slope in the direction of flow, though swampy areas partly choked with vegetation occur at intervals. The supposed great swamps forming the termination of the river were found to be of no greater importance than the similar features previously met with, and a well-defined bed was found to continue on in the direction of the Jub, which it eventually joins in the neighbourhood of Mombasa island. This lowest part of the channel, which is subjected to progressive filling with sediment similar to that noted in the Brava region, had been previously surveyed, but doubt existed whether it were not merely the lower course of the Madagoi, a periodical torrent having its source at an unknown distance in the interior. But it was proved that no water reaches the lower Webi from this direction—a fact confirmed by an examination of the sediments of the tract where the Madagoi has been supposed to come in. These contain great numbers of molluscs, such as are found in the Webi, but not on the course of the Madagoi. It should be noted that Webi merely signifies "river" among the Somalis, it being the first river of any size met with in their southward wanderings. Shabeli is a misnomer, being a purely local name derived from one of the tribes on its course.

M. Bruneau de Laborie's Journey across the Sahara viâ Kufara.

M. de Laborie's lecture before the Société de Géographie de France, in which he gave a vigorous description of his journey from French Equatorial Africa to Alexandria, is printed in full in *La Géographie*, May 1924. A brief reference had already been made to it in the *Journal*, 63, 362. M. de Laborie left Duala in the French Cameroons at the beginning of 1923, travelling by rail and motor to Yaunde. Thence he reached Fort Lamy by canoe in four days, and after a short stay continued his journey up the Shari in a whale boat to Fort Archambault. This part of the journey provided him with many opportunities for big-game shooting. The next stage was Abeshr, the starting-place of caravans for El Fasher and Kufara. While waiting here, in vain, for a safe-conduct to Kufara, he received many disquieting reports of the state of the country ahead. Finally he set out with camels for Faya in Borku, twenty days' journey to the north, where he arrived on September 11. Here he was encouraged by a local sheikh to persevere in his attempt to reach Kufara, and advised to travel unarmed, trusting in the hospitality of the Senussi. Eventually he left for Kufara with a party of eight, poorly armed. The journey across this region, lacking wood and pasturage, he compares to walking on asphalt. Until the peaceful nature of the expedition was known, he experienced difficulty in obtaining a guide on the frontier. The camels being lightly loaded, the party travelled exceptionally fast. The wells at Sarra were reached on October 12. After two days' rest, the crossing of the Libyan Desert was resumed by a route rarely if ever previously traversed by a European. Eight days later Tollab, the first village of the Kufara oasis, was reached. Displaying a bold front, M. de Laborie was entertained hospitably, though somewhat frigidly by the Zuiyas, until permission to visit Sidi Muhammad el Abed arrived. The following day the latter received him cordially at Taj. Having spent five days at Kufara, he dismissed his small party, and with one native companion joined a caravan on the way to Jalo. The journey was monotonous but severe. From Jalo he continued by Jaghbub, Matruh and Alexandria to Port Said, where he arrived on 2 January 1924, having covered approximately 8000 kms. in the year.

AMERICA

The Far North of Canada.

The Report of the Royal Canadian Mounted Police for the year ended 30 September 1923 interests us chiefly for the details given of the extension of Canadian authority in the Arctic Islands and other parts of the Far North. As already noted in the *Journal* (vol. 63, p. 457), a detachment of police was established in 1922 by Inspector Wilcox at Craig Harbour on Ellesmere Island, and wintered there, having no intercourse with the outside world from 28 August 1922 to 6 August 1923. The sun was last seen on October 25, and did not appear again until February 13—109 days of darkness and intense cold. Severe blizzards were frequent, and altogether the wind blew strongly for 221 days out of 304, compelling the men to remain indoors for days at a time. The coldest temperature recorded was 57° below zero in March, during which month the average was 35° below. It had been intended to move the post to Cape Sabine on the eastern coast, about 200 miles farther north, but as ice conditions made it impossible to reach that point, Craig Harbour remains the site of the Detachment. In 1923 Inspector Wilcox established a new post at Pangnirtung Fiord, in Cumberland Gulf, on the east coast of Baffin Island, this having become a trading centre of considerable local importance. The inspector and his party were left there by the steamer *Arctic* on September 11, and remained for the winter, buildings having been erected before the vessel sailed on September 22. The site chosen is described as a convenient spot, well protected from wind, on the south-east shore of the fiord, which runs in a northerly direction and is bordered by high rugged hills intersected by valleys. The place is supposed to be an excellent hunting ground for caribou. In the far north-west, new posts will be established at Fort Providence, Fort Rae, and Fort Hope, in the region of the lower Mackenzie and Great Bear and Great Slave lakes, their principal object being to control the native population. The post at Aklavik, which has replaced Herschel Island as the headquarters of the subdistrict, is being improved. On Baffin Island a patrol of some interest was carried out by Corporal McInnes and Constable McGregor to the Igloolik Eskimo settlement on Fury and Hecla Strait, at least 600 miles being travelled in 58 days. The Igloolik Eskimos were found to be divided into five different villages, all within a radius of 40 miles. They are a happy lot of people, and treated their visitors with the kindest hospitality. Dogs however were scarce, and deer-skins were unobtainable, caribou having been scarce in the district during the previous year. As a rule game of all kinds inhabiting the north is said to be plentiful at some season of the year, and the district must be one of the best in the north from a native's point of view. They are enthusiastic Christians, and new arrivals are always greeted by the singing of a hymn.

Captain John Smith's Map of Virginia, 1612.

This famous map, of the very rare first issue of which the Society secured a copy a few years ago, was prepared to accompany Captain John Smith's tract, 'A Map of Virginia,' written in 1612 as an encouragement to would-be settlers in the new plantation. It is an elaborate production embodying the results of actual surveys, and marked a great advance on anything that had preceded it. It was engraved by William Hole, but no author's name appears on it, and though it has been commonly ascribed to Smith as the writer of the tract above mentioned, no positive claim to its authorship is made by him in this tract. In an interesting article in the *Geographical Review* for July

1924, Mr. Worthington C. Ford brings forward certain reasons for supposing the map to have really been the work of Nathaniel Powell, a skilled surveyor, who had sailed to Virginia in 1607 and accompanied Newport in his expedition up the James River, afterwards, in the autumn of 1608, exploring Chesapeake Bay with Captain Smith. He was thus qualified to draw a map of the river and bay, and that he was the author of a map well thought of at the time is known from a letter by Robert Evelyn, first printed in 1641 and in 1648 incorporated in Beauchamp Plantagenet's 'A Description of New Albion,' which also refers elsewhere to "Captain Powel's Map" in association with other descriptions of New England and Virginia. Now the many re-issues or adaptations of the 1612 map made for many years after its first publication show that it long continued to be regarded as the best map of Virginia extant, while no other is known that might with any probability be identified with the map by Powell spoken of in 1648, so that the idea that Powell's and the 1612 map were one and the same certainly has much in its favour. Mr. Ford has collected a certain amount of information on Robert Evelyn, who with his uncle, Captain Thomas Young, in 1634, obtained from the king a far-reaching patent for making discoveries in America, and in 1637 was appointed Surveyor of Virginia; so that he had every means of knowing the best maps of the colony then in existence. A somewhat enigmatical reference (as it seems) to the map of 1612 occurs as late as 1659, when the Dutch representative in Maryland, Herrmann, saw three maps of Virginia, one of which was "printed at Amsterdam, by direction of Captain Smith." No such map is known, unless it be that the reference is to a reproduction of the original map of 1612 in one of the Dutch atlases of the time. There is no doubt much still to be learnt about the English map-makers of the early 17th century, as is shown by a casual reference by Robert Evelyn, in the letter of 1641, to "M. Daniel the plot-maker." Mr. Ford remarks that he has not been able to identify this man, but there can hardly be a doubt that he is the same as the author of one or more English charts of the period lately found by Dr. F. C. Wieder at Florence (see *Journal*, vol. 53, p. 277).

HISTORICAL AND ECONOMIC GEOGRAPHY

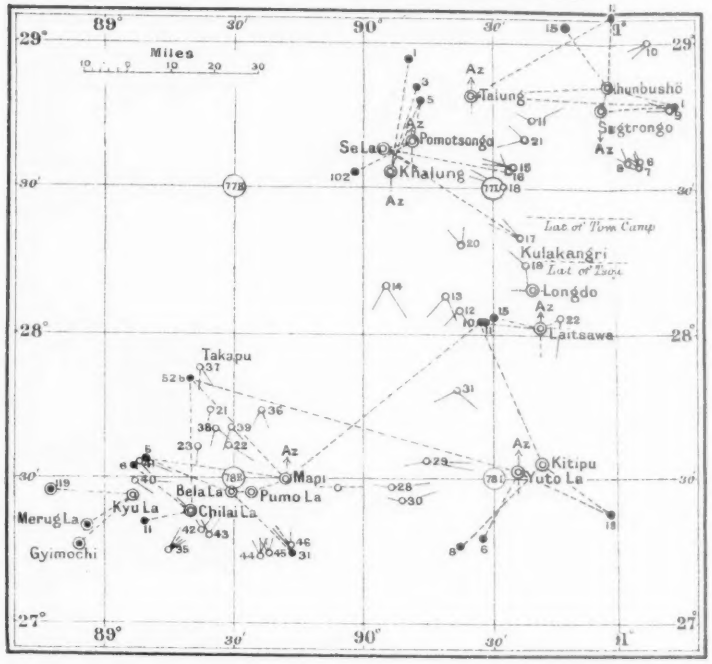
The Marmara Region.

An instructive paper by Prof. J. L. Myres entitled "The Marmara Region: a Study in Historical Geography," which was read before the British Association last year, is reprinted in the *Scottish Geographical Magazine* for May 1924. The Marmara region is a well-marked structural, biological, and economic unit. The sea consists of three main basins, caused by abrupt sinkings, on an east-and-west axis from Rodosto to the Gulf of Ismid. Its southern portion is the flooded margin of continental Asia Minor. The channels to the Ægean and the Black Sea are cut-back river valleys, slightly flooded by submergence. The recent origin of the sea basin accounts for the confused character of the drainage system. On the north side, the coastline is an escarpment, with hardly any streams, for the Maritza has cut back and captured, at Adrianople, an older stream which flowed eastward to the Marmara. Except for the Susurlu, similar conditions occur on the southern shores. This has meant that communications from the north to the south, as well as from east to west, across the sea, can be controlled at a few favourably situated points. In general, also, the over-deepened valleys are obstacles rather than lines of communications. In climate, also, the region is one of transition between two continental and two maritime areas. The lakeland

régime of the Marmara has been further moderated by the Ægean and Black Seas. At Constantinople the mean annual range of temperature is 32° F., that of Athens 34° F., and that of Sofia, in the continental interior, 43° F. The Ægean-like climate of the Black Sea region around Trebizond was responsible for considerably stimulating Greek intercourse with it. The transitional characteristics of the region have therefore enabled it to acclimatize living things of all kinds migrating from neighbouring areas. From the post-glacial period, with the spread of Alpine man from Asia Minor to north-west Europe, the area has been a route from south-east to north-west, and, as the entrance of the Phrygians into Phrygia and the Achæans into ancient Greece show, in the reverse direction also.

With the rise of Hellenic culture, the Marmara became the roadway to the Black Sea. The existence of a route over the Hellespont alternative to their threatened attack across the Bosphorus, materially assisted Philip and Alexander in their overthrow of the Persian Empire. The degree of Hellenization of the region is shown by the fact that Alexander founded no great cities there. Its first organization, as a regional state, was by Lysimachus. The foundation of Lysimachia, a little north of the isthmus of Gallipoli, enabled him to take a Macedonian attack in flank, to intercept corn supplies through the Dardanelles, to maintain touch with his Egyptian ally, and to throw a force into Asia Minor when necessary. The course of events which made the other end of the sea the centre of Roman power are set out very succinctly. At first the Roman line of communication to the Hellenized and commercially attractive east lay through Durazzo, Salonica, and across the Hellespont ferry. As Roman power spread northwards, this was superseded by a land route from Aquileia to Byzantium. This period saw the foundation of Hadrianopolis to keep the road open. To close the Marmara to Gothic raids, Nicomedia on the south-eastern shore was developed as a naval base. Diocletian's reorganization of frontier defence, the leaving of the Illyrian prefecture to look after itself, and the concentration on the eastern prefecture, with its capital at Nicomedia and its outpost at Adrianople, opened the way towards Constantine's choice of Byzantium as his Imperial capital, whose site enabled it to perform the functions of both Adrianople and Nicomedia. The breakdown of the Illyrian prefecture, and the Slav inroad, laid the foundations of the Balkan problem. Recent history has shown that Constantinople is only of value as a place of control: without the possession of provinces up to the limits of its control it is useless.

CHART OF TRIANGULATION

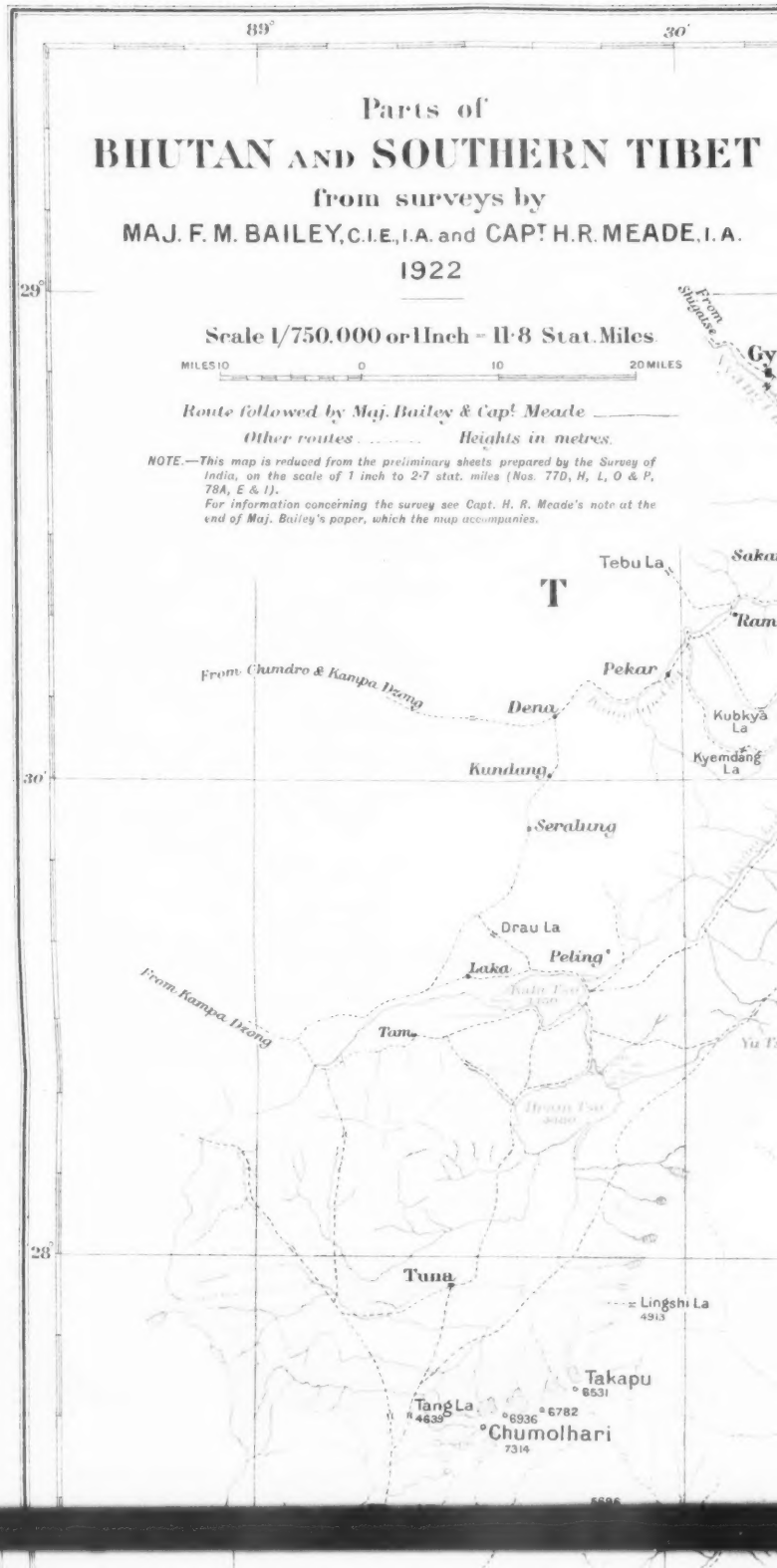


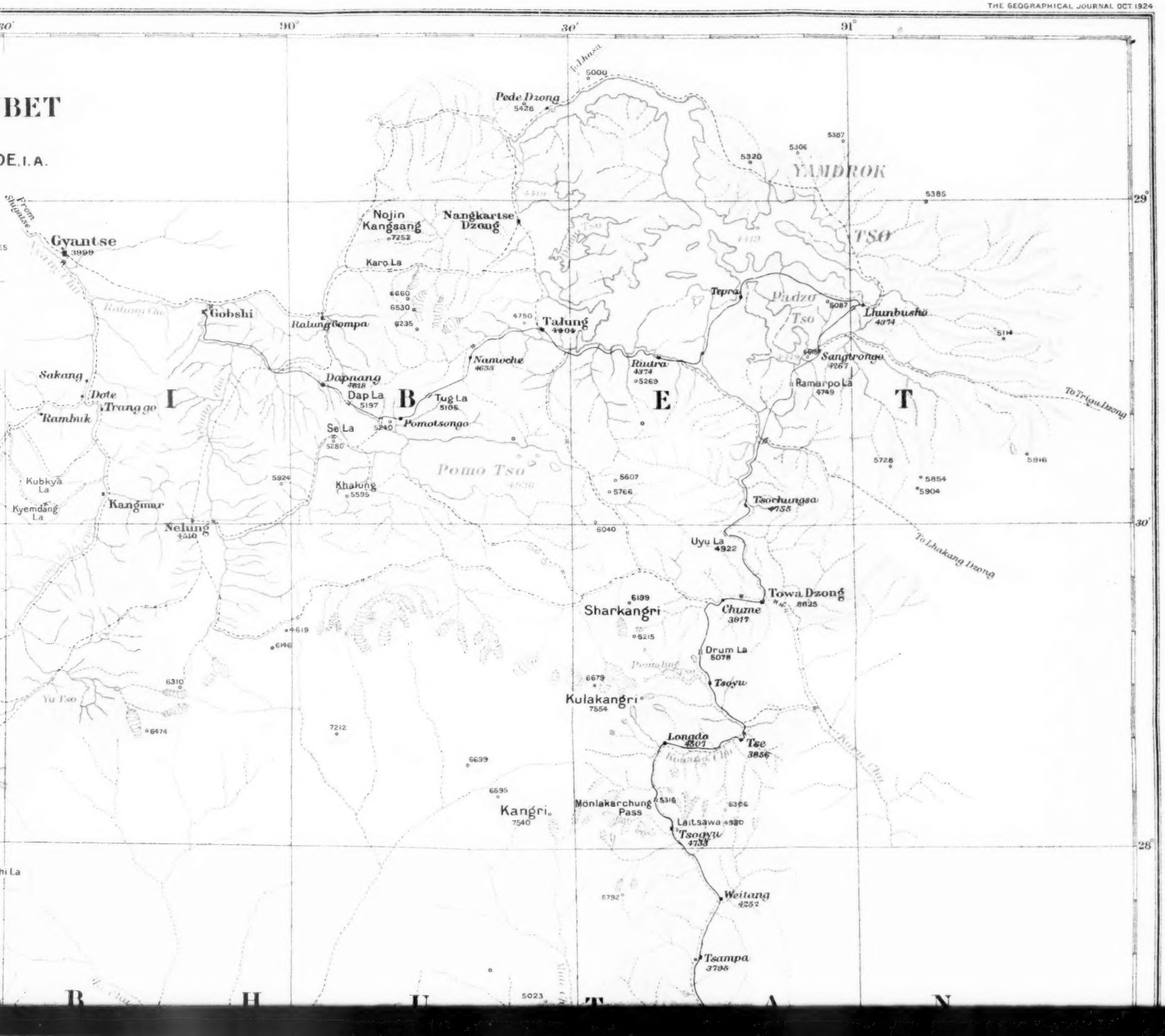
Reference

- Triangulated Stations
- Intersected Points
- Astronomical Azimuths
- ,, Latitudes
- Previously triangulated stations
- ,, intersected points

PRINCIPAL STATIONS

Sheet No.	Name	Latitude ° ′ ″	Longitude ° ′ ″	Heights in metres
77L	LAITSAWA	28 01 15	90 40 46	4930
	LONGDO	28 08 52	Plane-table ray	
	TSOYU	28 15 14		
	TOWA CAMP	28 23 24		
	SANGTRONGO	28 46 09	90 55 28	4618
	LHUNBUSHÖ	28 51 05	90 57 15	5087
	TALUNG	28 48 56	90 25 07	4750
	POMOTSONGO	28 39 38	90 11 09	5240
	KHALUNG	28 32 52	90 06 12	5595
	SE LA	28 37 48	90 01 50	5280
78E	KYU LA	27 26 19	89 07 11	4501
	CHILAI LA	27 22 59	89 20 16	4107
	BELA LA	27 26 57	89 29 17	3640
	PUMO LA	27 27 04	89 34 12	3983
	MAPI	27 29 48	89 42 01	3913
	WANGDUPOTRANG CAMP	27 27 59	Plane-table ray	
78I	YUTO LA	27 31 37	90 35 27	3680
	KITIPU	27 33 13	90 40 56	4131

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YAMDROK
TSO
5385
Nojin Kangsang
7252
Nangkartse Dzong
Gyantse
3999
Karo La
6660
6530
6235
Gobshi
Ralung Gompa
4750
Talung
4904
Tepra
Padzo Tso
5087
Lhunbusho
4974
5114
Nanyche
4633
Riutra
4374
5269
Sangtrongo
4267
Sakang
Dapnang
4618
Dap La
5197
Tug La
5165
Ramapo La
4749
To Trigu Dzong
Dote
Trang go
Rambuk
Se La
5240
5280
Pomotsongo
Pomo Tso
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Kyemdang La
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Khalung
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Nelung
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Uyu La
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To Lhakang Dzong
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Sharkangri
Towa Dzong
8625
Chume
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6215
4619
6146
Drum La
5078
Tsoyu
6679
Kulakangri
7554
6310
Yu Tso
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7212
Longdo
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Tse
3856
6699
6595
Kangri
7540
Monlakarchung Pass
5316
6305
Lai Tsawa
4930
Tsoyu
4733
5792
Weitang
4252
Tsampa
3796
5023

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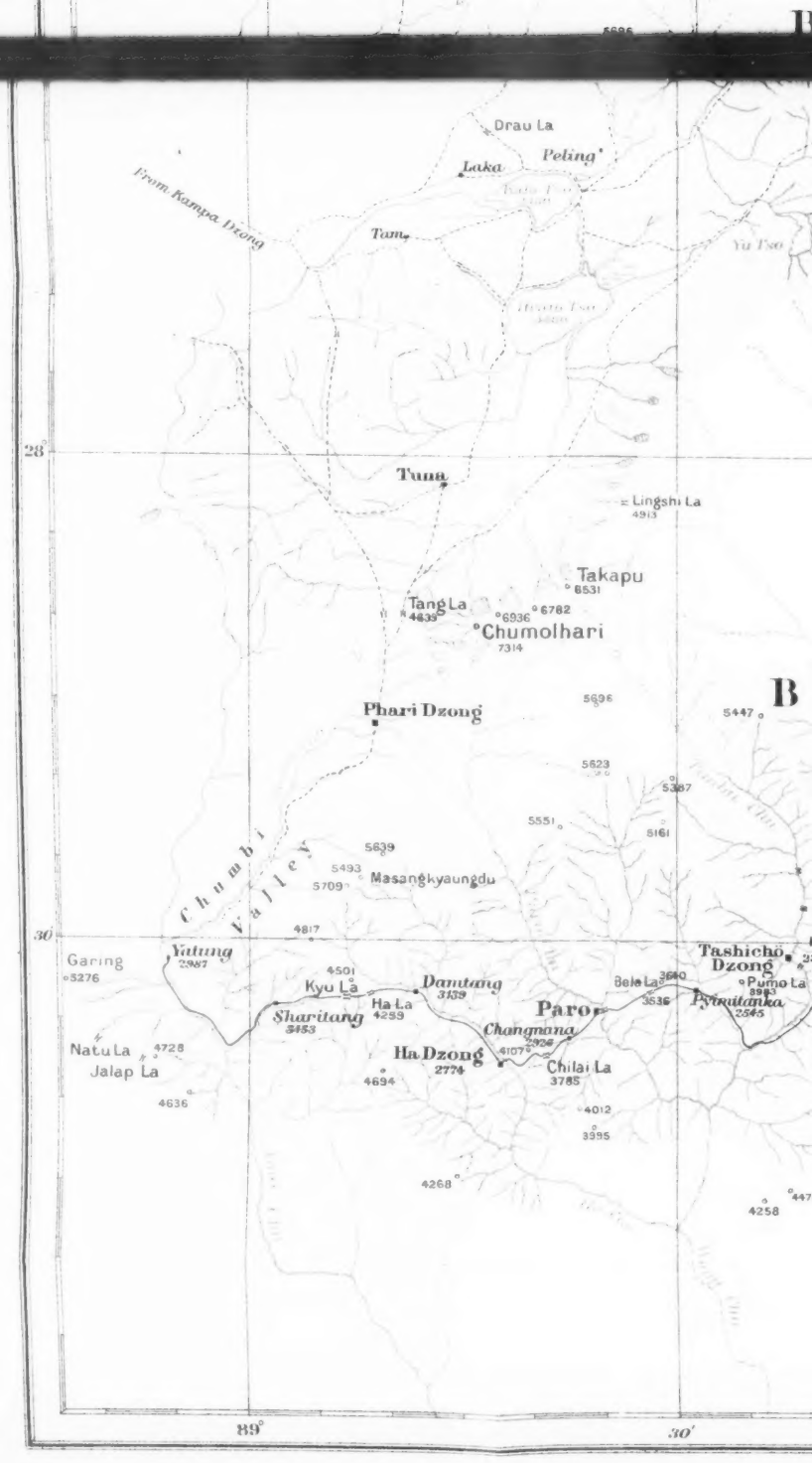
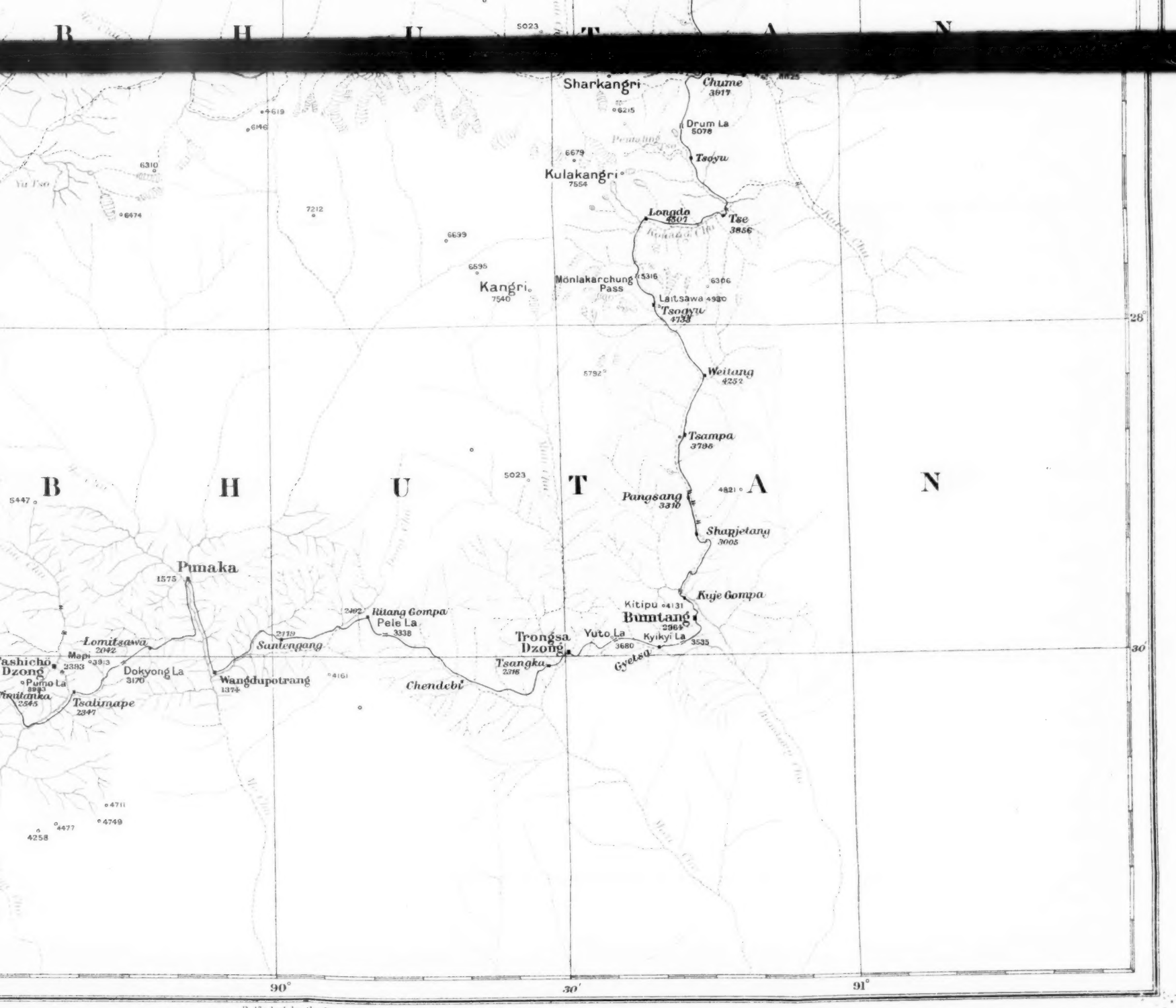
78I	YUTO LA	27 31 37	90 35 27	3680
	KITIPU	27 33 13	90 40 56	4131

INTERSECTED POINTS

Sheet No.	Point No.	Description	Latitude ° ′ ″	Longitude ° ′ ″	Heights in metres
77L	11	Pointed peak	28 43 56	90 38 58	5269
	12	N.W. of Kangri	04 39	22 11	6595
	13	N.W. of Kangri	07 33	19 04	6689
	14	——	09 28	05 01	7212
	15	Corrugated peak	34 12	34 22	5607
	16	Snow peak	33 19	33 33	5766
	17	Peak between Sharkangri and Kangri	19 41	36 13	6215
	18	Not highest point	30 06	32 11	6040
	19	Kulakangri	14 02	37 09	7554
	20	Snow peak	87 47	24 20	—
	21	Snowy point	40 02	36 59	—
	22	Peak E. of Mönlakarchung Pass	02 56	45 46	6306
77P	6	——	28 35 24	91 06 24	5854
	7	——	34 37	06 26	5904
	8	——	36 05	03 34	5728
	9	On Padzo Tso divide	45 58	13 41	5114
	10	Snow peak N.E. of Lhunbushö	59 49	08 01	5385
78E	21	Snow peak	27 43 41	89 24 40	5096
	22	——	27 36 34	29 02	5161
	23	Peak above Paro	36 09	21 48	5551
	35	Tegola Peak with Cairn	15 11	15 25	4268
	36	Snowpeak N. of Mapi	43 43	36 11	5447
	37	Takapu, Snowpeak	52 25	22 21	6531
	38	Southernmost of 3 peaks	39 55	25 38	5623
	39	High conical peak	40 06	29 35	5387
	40	Pointed peak at head of Ha Chu	29 00	07 24	4817
	41	Middle peak of Masangkyaungdü	33 07	08 30	5493
	42	Peak South of Paro	18 49	22 48	4012
	43	Round hill South of Paro	18 06	24 47	3995
	44	Sth. end of range between Wong Chu & Mo Chu	13 52	36 17	4258
	45	High point	18 44	38 01	4477
	46	Round peak	16 07	43 02	4711
78I	28	Peak	28 08	90 06 17	4161
	29	Dhungkajamso	33 38	14 51	4167
	30	Highest point in Dong Chu basin	25 18	08 32	—
	31	Peak on Dong Chu-Matt Chu divide	48 09	21 14	—





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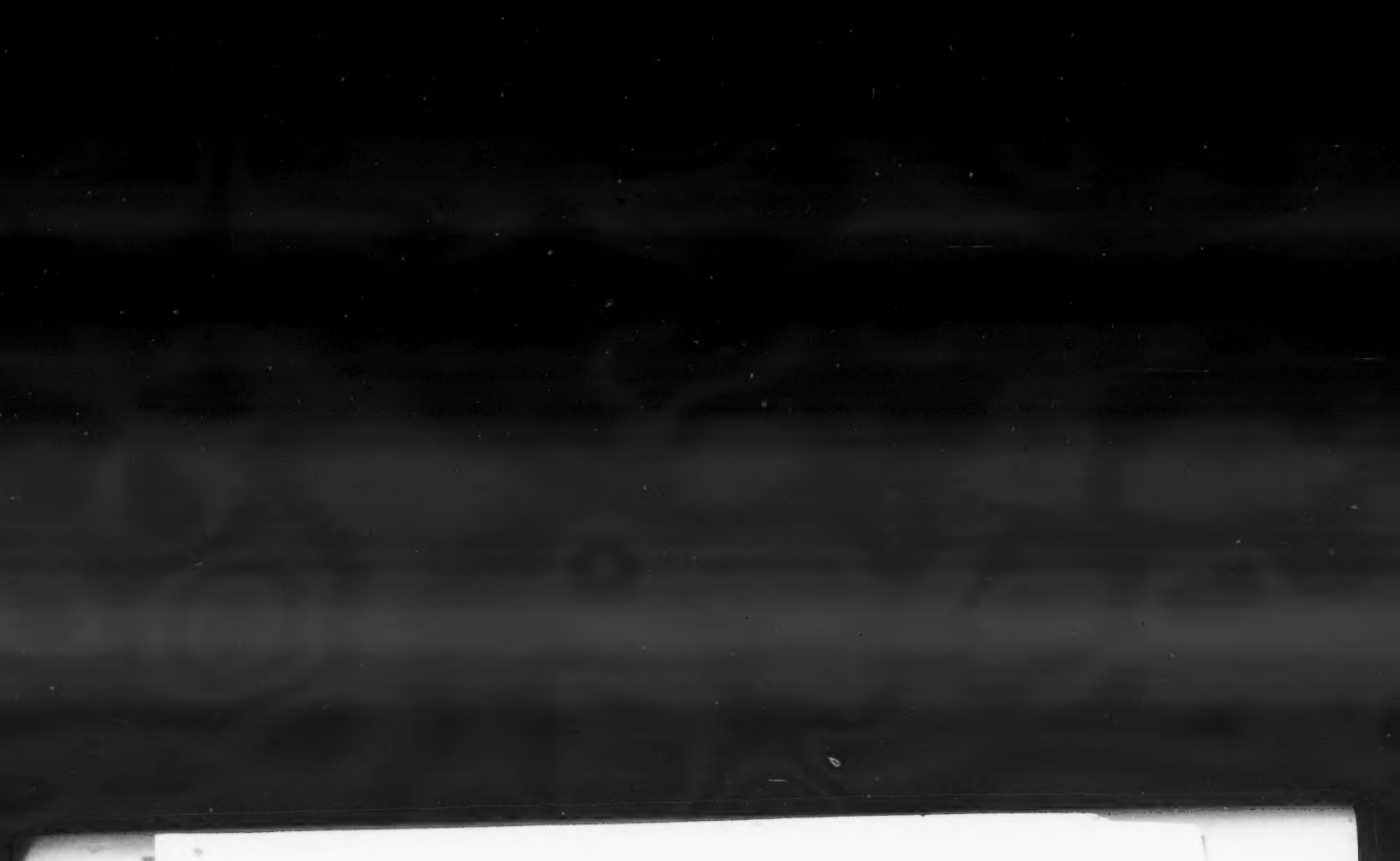
BHUTAN AND S^N TIBET
Bailey and Meade